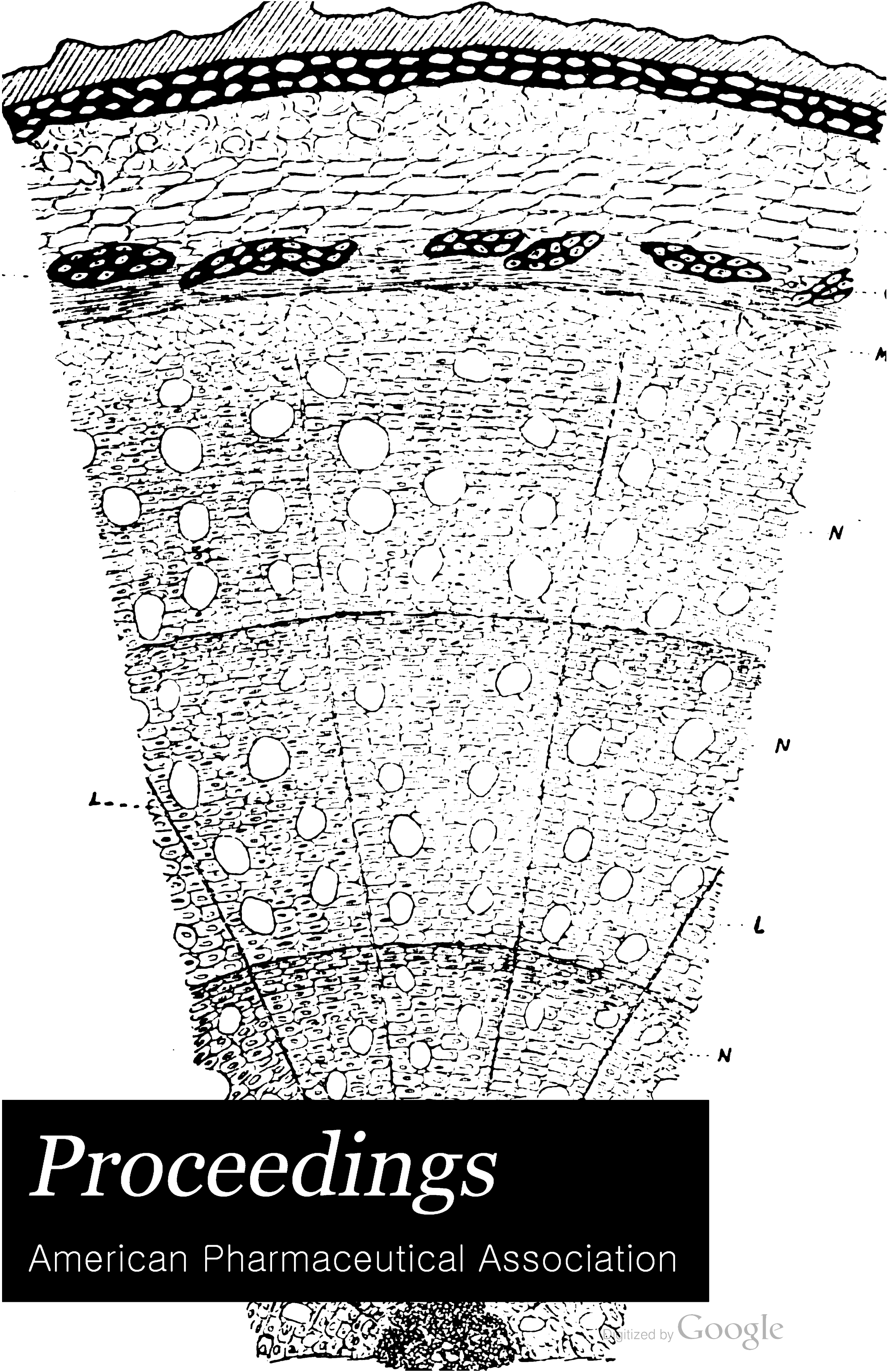

Proceedings

American Pharmaceutical Association

PROCEEDINGS

OF THE

American Pharmaceutical Association

AT THE

THIRTY-SEVENTH ANNUAL MEETING,

HELD AT SAN FRANCISCO, CAL., JUNE, 1889.

ALSO THE

CONSTITUTION, BY-LAWS AND ROLL OF MEMBERS.

PHILADELPHIA:
PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.
1889.

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1889-90.

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HENRY CANNING, Chairman.
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FREEMAN H. BUTLER, Lowell, Mass.

LIST OF OFFICERS OF THE ASSOCIATION SINCE ITS ORGANIZATION.

(DECEASED IN ITALICS.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Oct. 6, 1852	Philadelphia, Pa	*Daniel B. Smith*, Philadelphia.	*George W. Andrews*, Baltimore.	Samuel M. Colcord, Boston.	*C. Augustus Smith*, Cincinnati.
Aug. 24, 1853	Boston, Mass	William A. Brewer, Boston.	George D. Coggeshall, New York.	*Alexander Duval*, Richmond, Va.	Charles B. Guthrie, Memphis, Tenn.
July 25, 1854	Cincinnati, O	*William B. Chapman*, Cincinnati.	Henry T. Cummings, Portland, Me.	*John Meakim*, New York.	*Joseph Laidley*, Richmond, Va.
Sept. 11, 1855	New York, N. Y	*John Meakim*, New York.	Charles B. Guthrie, Memphis, Tenn.	*Charles Ellis*, Philadelphia.	*Henry F. Fish*, Waterbury, Conn.
Sept. 9, 1856	Baltimore, Md	*George W. Andrews*, Baltimore.	*John L. Kidwell*, Washington, D. C.	Frederick Stearns, Detroit, Mich.	*Henry T. Kiersted*, New York.
Sept. 8, 1857	Philadelphia, Pa	*Charles Ellis*, Philadelphia.	*James Cooke*, Fredericksburg, Va.	*Samuel P. Peck*, Bennington, Vt.	A. E. Richards, Plaquemine, La.
Sept. 14, 1858	Washington, D. C	*John L. Kidwell*, Georgetown, D. C.	Edward R. Squibb, Brooklyn, N. Y.	*James O'Gallagher*, St. Louis.	Robert Battey, Rome, Ga.
Sept. 13, 1859	Boston, Mass	Samuel M. Colcord, Boston.	*William Procter, Jr.*, Philadelphia.	*Joseph Roberts*, Baltimore.	Edwin O. Gale, Chicago.
Sept. 11, 1860	New York, N. Y	*Henry T. Kiersted*, New York.	William J. M. Gordon, Cincinnati.	William S. Thompson, Baltimore.	Theodore Metcalf, Boston.
Aug. 27, 1862	Philadelphia, Pa	*William Procter, Jr.*, Philadelphia.	*John Milhau*, New York.	*Eugene L. Massot*, St. Louis.	*J. Faris Moore*, Baltimore.
Sept. 8, 1863	Baltimore, Md	*J. Faris Moore*, Baltimore.	John M. Maisch, Philadelphia.	Chas. A. Tufts. Dover, N. H.	*George W. Weyman*, Pittsburgh.

LIST OF OFFICERS. (Continued.)

Date.	Place of Meeting.	Presidents.	First Vice-Presidents.	Second Vice-Presidents.	Third Vice-Presidents.
Sept. 21, 1864 .	Cincinnati, O. . . .	William J. M. Gordon, Cincinnati.	*Richard H. Stabler*, Alexandria, Va.	Enno Sander, St. Louis.	*Thomas Hollis*, Boston.
Sept. 5, 1865 .	Boston, Mass . . .	*Henry W. Lincoln*, Boston.	George C. Close, Brooklyn, N. Y.	*Elijah W. Sackrider*, Cleveland, O.	Charles A. Heinitsh, Lancaster, Pa.
Aug. 22, 1866 .	Detroit, Mich . . .	Frederick Stearns, Detroit, Mich.	*Edward Parrish*, Philadelphia.	Ezekiel H. Sargent, Chicago.	*John W. Shedden*, New York.
Sept. 10, 1867 .	New York	*John Milhau*, New York.	Robert J. Brown, Leavenworth, Kan.	N. Hynson Jennings, Baltimore.	*Daniel Henchman*, Boston.
Sept. 8, 1868 .	Philadelphia, Pa . .	*Edward Parrish*, Philadelphia.	*Ferris Bringhurst*, Wilmington, Del.	*Edward S. Wayne*, Cincinnati.	Albert E. Ebert, Chicago.
Sept. 7, 1869 .	Chicago, Ill	Ezekiel H. Sargent, Chicago.	Ferdinand W. Sennewald, St. Louis.	John H. Pope, New Orleans.	Joel S. Orne, Cambridgeport, Mass.
Sept. 13, 1870 .	Baltimore, Md . . .	*Richard H. Stabler*, Alexandria, Va.	Fleming G. Grieve, Milledgeville, Ga.	James G. Steele, San Francisco.	*Eugene L. Massot*, St. Louis.
Sept. 12, 1871 .	St. Louis, Mo . . .	Enno Sander, St. Louis.	C. Lewis Diehl, Louisville, Ky.	George F. H. Markoe, Boston.	Matthew F. Ash, Jackson, Miss.
Sept. 3, 1872 .	Cleveland, O . . .	Albert E. Ebert, Chicago.	*Samuel S. Garrigues*, East Saginaw, Mich.	Edward P. Nichols, Newark, N. J.	Henry C. Gaylord, Cleveland, O.
Sept. 16, 1873 .	Richmond, Va. . .	John F. Hancock, Baltimore.	William Saunders, London, Ont.	John T. Buck, Jackson, Miss.	Paul Balluff, New York.
Sept. 8, 1874 .	Louisville, Ky . . .	C. Lewis Diehl, Louisville, Ky.	*Joseph Roberts*, Baltimore.	William T. Wenzell, San Francisco.	Augustus R. Bayley, Cambridgeport, Mass.
Sept. 7, 1875 .	Boston, Mass. . . .	George F. H. Markoe, Boston.	Frederick Hoffmann, New York.	T. Roberts Baker, Richmond, Va.	Christian F. G. Meyer, St. Louis.

Sept. 12, 1876.	Philadelphia, Pa. .	Charles Bullock, Philadelphia.	Samuel A. D. Sheppard, Boston.	*Gustavus J. Luhn*, Charleston, S. C.	Jacob D. Wells, Cincinnati.
Sept. 4, 1877.	Toronto, Can. . . .	William Saunders, London, Ont.	Ewen McIntyre, New York.	John Ingalls, Macon, Ga.	Emlen Painter, San Francisco.
Nov. 26, 1878.	Atlanta, Ga. . . .	*Gustavus J. Luhn*, Charleston, S. C.	Frederick T. Whiting, Great Barrington, Mass.	Henry J. Rose, Toronto, Can.	*William H. Crawford*, St. Louis.
Sept. 9, 1879.	Indianapolis, Ind. .	George W. Sloan, Indianapolis, Ind.	T. Roberts Baker, Richmond, Va.	Joseph L. Lemberger, Lebanon, Pa.	Philip C. Candidus, Mobile, Ala.
Sept. 14, 1880.	Saratoga, N. Y. . .	James T. Shinn, Philadelphia.	George H. Schafer, Fort Madison, Ia.	William S. Thompson, Washington.	William Simpson, Raleigh, N. C.
Aug. 23, 1881.	Kansas City, Mo. .	P. Wendover Bedford, New York.	Emlen Painter, San Francisco.	George Leis, Lawrence, Kan.	John F. Judge, Cincinnati.
Sept. 12, 1882.	Niagara Falls, N. Y.	Charles A. Heinitsh, Lancaster, Pa.	John Ingalls, Macon, Ga.	Louis Dohme, Baltimore.	William B. Blanding, Providence, R. I.
Sept. 11, 1883.	Washington, D. C. .	William S. Thompson, Washington, D. C.	Charles Rice, New York.	*Frederick H. Masi*, Norfolk, Va.	Edward W. Runyon, San Francisco.
Aug. 26, 1884.	Milwaukee, Wis. .	John Ingalls, Macon, Ga.	John A. Dadd, Milwaukee, Wis.	Henry Canning, Boston, Mass.	Charles F. Goodman, Omaha, Neb.
Sept. 8, 1885.	Pittsburgh, Pa. . .	*Joseph Roberts*, Baltimore, Md.	Albert H. Hollister, Madison, Wis.	Albert B. Prescott, Ann Arbor, Mich.	Joseph S. Evans, West Chester, Pa.
Sept. 7, 1886.	Providence, R. I. .	Chas. A. Tufts, Dover, N. H.	*Henry J. Menninger*, Brooklyn, N. Y.	M. W. Alexander, St. Louis, Mo.	Norman A. Kuhn, Omaha, Neb.
Sept. 5, 1887.	Cincinnati, O. . . .	John U. Lloyd, Cincinnati, O.	M. W. Alexander, St. Louis, Mo.	A. K. Finlay, New Orleans, La.	Karl Simmon, St. Paul, Minn.
Sept. 3, 1888.	Detroit, Mich. . . .	M. W. Alexander, St. Louis, Mo.	Jas. Vernor, Detroit, Mich.	Fred. Wilcox, Waterbury, Conn.	Alvin A. Yeager, Knoxville, Tenn.
June 24, 1889.	San Francisco, Cal.	Emlen Painter, New York.	Karl Simmon, St. Paul, Minn.	Wm. M. Searby, San Francisco.	Jos. W. Eckford, Aberdeen, Miss.
Sept. 8, 1890.	Old P't Comfort, Va.				

TREASURERS.

Alfred B. Taylor, Philadelphia, 1852–54.
Samuel M. Colcord, Boston, 1854–56, and 1857–59.
James S. Aspinwall, New York, 1856–57.
Ashel Boyden, Boston, 1859–60.
Henry Haviland, New York, 1860–63.
J. Brown Baxley, Baltimore, 1863–65.
Charles A. Tufts, Dover, N. H., 1865–86.
Samuel A. D. Sheppard, Boston, 1886–90.

RECORDING SECRETARIES

George D. Coggeshall, New York, 1852–53.
Edward Parrish, Philadelphia, 1853–54.
Edward S. Wayne, Cincinnati, 1854–55.
William J. M. Gordon, Cincinnati, 1855–59.
Charles Bullock, Philadelphia, 1859–60.
James T. Shinn, Philadelphia, 1860–62.
Peter W. Bedford, New York, 1862–63.
William Evans, Jr., Philadelphia, 1863-64.
Henry N. Rittenhouse, Philadelphia, 1864–65.
John M. Maisch, Philadelphia, 1865–90.

CORRESPONDING SECRETARIES.

William Procter, Jr., Philadelphia, 1852–53, and 1854–57.
William B. Chapman, Cincinnati, 1853–54.
Edwara Parrish, Philadelphia, 1857–58.
Ambrose Smith, Philadelphia, 1858–59.
William Hegeman, New York, 1859–60.
Peter W. Bedford, New York, 1860–62, and 1863–66.
John M. Maisch, Philadelphia, 1862–63.

LOCAL SECRETARIES.

For the meeting held in	
1867	P. Wendover Bedford.
1868	Alfred B. Taylor.
1869	Henry W. Fuller.
1870	*J. Faris Moore.*
1871	*William H. Crawford.*
1872	Henry C. Gaylord.
1873	Thomas H. Hazard.
1874	Emil Scheffer.
1875	Samuel A. D. Sheppard.
1876	Adolphus W. Miller.
1877	Henry J. Rose.
1878	Jesse W. Rankin.
1879	Eli Lilly.
1880	Charles F. Fish.
1881	William T. Ford.
1882	*Hiram E. Griffith.*
1883	Charles Becker.
1884	Henry C. Schranck.
1885	George A. Kelly.
1886	William B. Blanding.
1887	George W. Voss.
1888	James Vernor.
1889	Edward W. Runyon.
1890	Charles E. Dohme.

REPORTER ON PROGRESS OF PHARMACY.

C. L. Diehl, Louisville, Ky., 1873–90.

AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That whilst it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)

Alabama,	P. C. Candidus,	Mobile.
Arkansas,	John B. Bond, Main and 5th streets,	Little Rock.
California,	William T. Wenzell,	San Francisco.
Colorado,	Edmund L. Scholtz,	Denver.
Dis. of Columbia,	John A. Milburn, 1120 Thirteenth St., N. W.,	Washington.
Connecticut,	John K. Williams, 391 Main street,	Hartford.
	Warren A. Spalding, 19 Church street,	New Haven.
	Luzerne I. Munson, Apothecaries' Hall,	Waterbury.
Delaware,	Linton Smith, corner Church and Bennett streets,	Wilmington.
Georgia,	Theo. Schumann, Whitehall and Hunter streets,	Atlanta.
	Robert H. Land, 812 Broad street,	Augusta.
	John Ingalls, corner Fourth and Poplar streets,	Macon.

Illinois,	C. S. N. Hallberg, 69 Dearborn street,	Chicago.
	David G. Plummer, 6 Main street,	Bradford.
	Charles Zimmermann, 423 S. Adams street.	Peoria.
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	George W. Sloan, 304 N. Meridian street,	Indianapolis.
	David Hilt, 84 Main street,	Lafayette.
	Jacob Baur,	Terre Haute.
Iowa,	John W. Ballard, 106 West Second Street,	Davenport.
	Theodore W. Ruete, 379 Main street,	Dubuque.
	George H. Schafer, 129 Front street,	Fort Madison.
	Silas H. Moore, 80 Fourth street,	Sioux City.
Kansas,	George Leis, 90 Massachusetts street,	Lawrence.
	Robert J. Brown, 113 Delaware street,	Leavenworth.
Kentucky,	George A. Zwick, Eleventh street and Madison avenue,	Covington,
	William H Averill, 435 Main street,	Frankfort.
	C. Lewis Diehl, corner Third and Broadway,	Louisville.
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Maine,	Noah S. Harlow, 4 Smith's Block,	Bangor.
	Edmund Dana, Jr., 373 Congress street,	Portland.
Maryland,	D. M. R. Culbreth, Charles and Eager streets,	Baltimore.
	Thomas W. Shryer, 103 Baltimore street,	Cumberland.
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	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, 51 Vine street,	Charlestown.
	Frederick T. Whiting, Main street,	Great Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	Joseph W. Colcord, 153 Union street,	Lynn.
	James E. Blake, 65 North Second street,	New Bedford.
	Joseph J. Estes, Union and Church streets,	Rockland.
	Thomas B. Nichols, 159 Essex street,	Salem.
	William Bush, 56 Front street,	Worcester.
Michigan,	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	James Vernor, 235 Woodward avenue,	Detroit.
	Jacob Jesson, Western avenue and Jefferson street,	Muskegon.
Minnesota,	E. Floyd Allen, 1020 Hennepin avenue,	Minneapolis.
	Karl Simmon, Seventh and Sibley streets,	St. Paul.
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	Matthew F. Ash,	Jackson.
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	Jonathan B. Drake, 132 Broad street,	Elizabeth.
	Hermann Klussmann, Fourth street and Lafayette avenue,	Hoboken.

	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 831 Broad street,	Newark.
	Howard P. Reynolds, Park and North avenues,	Plainfield.
New York,	Charles H. Gaus, 202 Washington avenue,	Albany.
	G. C. Close, 67 Cumberland street,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. Dubois, 281 Main street,	Catskill.
	John Hepburn, 103 Main street.	Flushing.
	Harvey G. Goodale, P. O. Box 29,	Jamaica.
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	John G. Bissell, 45 Dominick street,	Rome.
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	Willis T. Hanson, 195 State street,	Schenectady.
	Charles W. Snow, 28 East Genesee street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
North Carolina,	William Simpson, 33 Fayetteville street,	Raleigh.
	John H. Hardin, 124 South Front street,	Wilmington.
Ohio,	Andrew M. Armstrong, 106 East Market street,	Akron.
	Walter H. Howson, Water and Walnut sts.,	Chillicothe.
	J. U. Lloyd, Court and Plum streets,	Cincinnati.
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	Otto S. Weusthoff, 218 East 3d street,	Dayton.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohley, 248 South street,	Toledo.
	Edgar M. Hatton, Fifth and Main streets,	Zanesville.
Pennsylvania,	Jacob A. Miller, cor. Second and Chestnut streets,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 8 North Ninth street,	Lebanon.
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	George A. Kelly, 101 Wood street,	Pittsburgh.
	Philip M. Ziegler, 526 Penn street,	Reading.
	John M. McNeil, Broadway,	Scottdale.
	Edward A. Cornell, Tenth and Pine streets,	Williamsport.
Rhode Island,	James H. Taylor, 104 Thomas street,	Newport.
	Wm. K. Reynolds, 254 Friendship street,	Providence.
South Carolina,	Charles F. Panknin, 181 Meeting street,	Charleston.
Tennessee,	Jas. S. Robinson, Third and Madison streets,	Memphis.
	John C. Wharton, 38 Union street,	Nashville.
Texas,	Thomas W. Powell, 10 Houston street,	Fort Worth.
Vermont,	Geo. A. Crossman, 2 Simonds Block,	Brandon.
Virginia,	T. Roberts Baker, 919 East Main street,	Richmond.
Washington,	Henry E. Holmes, 19 Main street,	Walla Walla.
West Virginia,	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
	Edmund Bocking, 1 Odd Fellows' Hall,	Wheeling.

Wisconsin,	John R. Drake, 365 East Water street,	Milwaukee.
	Albert H. Hollister, 25 Pinckney street,	Madison.
Prov. Nova Scotia,	Francis C. Simson,	Halifax.
Prov. Ontario,	John Lowden, 18 DeBreseles street,	Toronto.
Prov. Quebec,	Henry R. Gray, 144 St Lawrence Main street,	Montreal.

THE PERMANENT FUNDS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the San Francisco meeting in 1889, the Permanent Secretary was directed to publish annually in the Proceedings, a brief history of the origin, money value, and use to which each fund may be applied.

There are three permanent funds at the present time, all of which are invested in government bonds, in the name of the Treasurer of the American Pharmaceutical Association, and kept in the custody of the Chairman of the Council.

THE LIFE MEMBERSHIP FUND.

The Constitution as originally adopted in 1852, and up to the year 1856, contained no provision for life membership or for the creation of a permanent fund. In the year named, a revised Constitution was reported by a committee and after consideration adopted (see Proceedings 1856, pp. 12, 14, 27 and 79). Article II, Section 7, (afterwards Section 8) contained the following provision

" Members who have paid their annual contribution for ten successive years shall be considered life members, and exempt from their yearly payments, and entitled to a certificate to that effect."

Owing to increased expenditures for the publication of the Proceedings, etc., the Association found it necessary in 1867 (Proceedings, p. 75) to increase its revenue, one of the measures being the erasing of Section 8, and the total abandonment of life membership in the future.

In 1870 a revised Constitution was adopted (see Proceedings, 1870, pp. 87–96), and is in force at the present time, containing the following:

Article IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, *the annual interest of which only shall be used by the Association for its current expenses.*

Chapter VI, Article 5, of the By-laws adopted the same year read as follows:

Any member who shall pay to the Treasurer the sum of *seventy-five dollars at a time* shall become a life member, and shall be exempt from all future annual contributions.

In the roll of members for the year 1872 (page 338) the name of the late Charles W. Badger, of Newark, N. J., appears for the first time as a life member, and the only one (until the time of his death in 1877) under this provision, which was subsequently modified (Proceedings 1879, page 799) so as to reduce the sum to be paid into the treasury by those who had been members for from five to twenty years. In the same year the published roll contained the names of two new life members. The article on life membership was further modified in 1888 (Proceedings, page 52) so as to apply also to those who have been members for over twenty years (See Chapter VIII, Article 4 of By-laws). Under this clause the life membership (new style) of the present roll is twenty-seven, as published in the Proceedings, page 746.

The Treasurer's report for 1880 (page 524) states the life membership fund to be $75, for 1881 (p. 513) $613, for 1882 (p. 608) $685, for 1883 (p. 436) $904.38, and for 1884 (p. 524) $944.14. At the Milwaukee meeting held in the same year, the Association directed (Proceedings, p. 525) that $316, which amount had been in past years donated to the funds of the Association by various members, be withdrawn from the general fund and be added to the life membership fund. At the Providence meeting in 1886, (Proceedings, p. 147) it was recommended by the Finance Committee, and approved by the Council and by the Association, that the sum of $3000 be transferred from the general fund to the life membership fund. At the Cincinnati meeting in 1887, (Proceedings, p. 471) the Association ordered again a transfer to the same fund of $4000.

Since 1887 the annual reports of the Chairman of the Council give the number of each bond of the Government securities in which the life membership fund is invested. The report published on page 17 of the present volume shows that on May 1, 1889 the value of the life membership fund was $9710.41, of which sum *the annual interest only can be used by the Association for its current expenses.*

THE EBERT FUND.

At the Richmond meeting in 1873 (Proceedings, page 58) Mr. Albert E. Ebert presented to the Association the sum of five hundred dollars, to be used in the following manner:

"The money to be properly invested by order of the Executive Committee, and the annual interest derived therefrom to be appropriated *for conferring a suitable prize* for the best essay or written contribution containing AN ORIGINAL INVESTIGATION OF A MEDICINAL SUBSTANCE, determining new properties, or containing other meritorious contributions to knowledge; or for IMPROVED METHODS of determined merit, for the preparation of chemical or pharmacal products; the prize to be awarded by a suitable committee within six months after the annual meeting at which the essays are presented for competition; *provided*, that in case no one of the essays offered is of sufficient merit to justify the award, in the judgment of the Committee on Prize Essays, all may be rejected, and the sum added to that of the Fund."

The offer was accepted by the Association, and by a special vote (*Ibid.*, page 70) the fund was ordered to be called the *Ebert Fund*, and the prize awarded from the proceeds to be known as the *Ebert Prize*.

The Ebert Prize was awarded for the year 1874 to Chas. L. Mitchell; for 1877, to Fred. B. Power; for 1882, to John U. Lloyd; for 1886, to Emlen Painter; for 1887, to Edward Kremers, and for 1888, to Jos. F. Geisler.

The Ebert Fund amounted in 1883 (Proceedings, p. 436) to $683.43. Since 1887 the reports of the Chairman of the Council specify the securities in which this fund is invested. On May 1, 1889, (Proceedings, p. 17) its reported value was $811.78. The *annual interest must be applied to a prize for an original investigation* meeting the requirements stated above.

THE CENTENNIAL FUND.

After the meeting held in Philadelphia in 1876, the local committees on settling all accounts for the entertainment of the Association had an unexpended balance left, which by subsequent collections made in Philadelphia was increased to $525. At the Toronto meeting in 1877 (Proceedings, p. 481), Dr. A. W. Miller, local secretary for 1876, presented this sum, in the name of the local committees, to the Association, with this condition, "that a like amount be subscribed by the members within one year," with a view of establishing a fund *to aid in the prosecution of original investigations*, the interest accruing from the investment of the fund to be devoted to the defraying of expenses actually in-

curred by members in conducting investigations in some branch of science connected with pharmacy. The Association accepted the conditions (*ibid.*, pp. 526, 528), and adopted the name *Centennial Fund.*

The collection of a like amount by the Association was completed at the Saratoga meeting in 1880 (Proceedings, p. 553) when $582.81 had been thus received. A committee of the Centennial Fund was provided for in the By-Laws of the Council, Chapter VII., in 1881 (Proceedings, pp. 490, 549). Members have not availed themselves of this fund to the extent contemplated at its foundation; for the amounts paid out have been only $7.50 to Rob. B. Warder for material used for investigations reported in 1885, and $76.80 used by the Committee on National Formulary during the years 1886 and 1887. (Proceedings, p. 436.)

The original sum of $1117.81 ($525+582.81), had increased in 1883 to $1232.76. Since 1887 the securities in which the fund is invested are specified in the reports of the Chairman of the Council; the reported value was $1499.57 in May 1889 (see Proceedings, p. 17). *The interest accruing from this fund is to be used for defraying the expenses incurred in conducting original investigations in pharmacy or an allied science.*

AMENDMENTS TO THE BY-LAWS.

TO BE ACTED ON AT THE THIRTY-EIGHTH ANNUAL MEETING.

To be acted on at the thirty-eighth annual meeting.

The amendments of which notice has been given by Karl Simmon at the Ninth Session of the San Francisco meeting, have been formulated as follows:

Chapter VII., Article I. In first line strike out *six* and insert *five*, and in fourth and fifth lines strike out *a Committee on Legislation, and a Committee on Pharmaceutical Education*, and insert in place thereof *and a Committee on Pharmaceutical Legislation and Education*, so as to make the article read as follows:

Article I. There shall be five standing committees: A Committee on Commercial Interests, and on the Revision of the U. S. Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays, and a Committee on Pharmaceutical Legislation and Education, each to consist of three members.

Article VII. In first line and also in second line, strike out the words *on Legislation*, and insert in both places the words *on Pharmaceutical Legislation and Education;* strike out in fourth line the words *the subject*, and insert in place thereof *pharmaceutical subjects;* also in sixth line strike out *and*, and after the word "discussion" add, *and shall attend to such duties as may be delegated to them by the Section;* so as to make the article read as follows:

Article VII. The Committee on Pharmaceutical Legislation and Education, which shall be elected by the Section on Pharmaceutical Legislation and Education, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on pharmaceutical subjects has occurred during the year. They shall arrange the business of the Section in advance of its meetings, propose suitable subjects for discussion, and shall attend to such duties as may be delegated to them by the Section.

Article IX. Strike out the whole article.

Chapter IX., Article II. In first line strike out *four* and insert *three;* and in last line strike out *Education*; *4. Legislation*, and insert *Legislation and Education;* so as to make the article read as follows:

Article II. To expedite and render more efficient the work of the Association, three Sections shall be formed, as follows; 1. Scientific Papers; 2. Commercial Interests; 3. Pharmaceutical Legislation and Education.

Strike out the present Article VII., and insert in place thereof the following:

Article VII. At the eighth session the Section on Pharmaceutical Legislation and Education shall consider the business assigned to that Section.

CONTENTS.

Minutes of Section on Pharmaceutical Education.

Minutes of Section on Pharmaceutical Legislation.

Report on Progress of Pharmacy.

Appendix.

PREFATORY NOTICE.

According to the By-laws, the Report on the Progress of Pharmacy must embrace the publications up to June 30th of the year in which it is presented. The minutes of the different sessions, together with the papers, were printed by the time the report could be finished.

From an obituary received too late for publication with the report of the Committee on Membership, the following extract is here inserted: Hugo R. Hartung was born in Pittsburgh, Pa., where he graduated from the High School and then learned the drug business. Afterward he studied in Germany, then clerked in Wheeling, W. Va., and in Denver, Col., and since 1886 studied medicine. He died in New York City of hemorrhage of the lungs.

With the exception of 1856 (out of print), and 1861 (none published), the Proceedings of the Association can still be furnished complete, beginning with the initial meeting in 1851; but of several years only from thirty to forty copies are on hand. The Committee on Publication, thinking that many members would like to complete their sets, has decided to considerably reduce the price of the older volumes, and to offer them, *including postage*, as follows:

UNBOUND (IN PAPER COVER).

1851, 1852, 1853, 1854, 1855	each	25 cts.
1857	"	50 cts.
1858, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872	"	$1 00
1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880	"	2 50
1881, 1882, 1883, 1884, 1885	"	3 50
1886, 1887, 1888	"	5 00

BOUND.

1857	"	75
1858, 1859, 1860	"	1 00
1862, 1863, 1864, 1865, 1866, 1867, 1868, 1869, 1870, 1871, 1872	"	1 50
1873, 1874, 1875, 1876, 1877, 1878, 1879, 1880	"	3 00
1881, 1882, 1883, 1884, 1885	"	4 00
1886, 1887, 1888, 1889	"	5 50

IN SETS (EXCLUSIVE OF THE POSTAGE OR EXPRESS CHARGES).

For any two or three volumes a discount of 10 per cent. on the above prices.
For any four to eight volumes a discount of 20 per cent. on the above prices.
For any nine to fifteen volumes a discount of 30 per cent. on the above prices.
For any sixteen to twenty-two volumes, a discount of 40 per cent. on the above prices.
For any twenty-three to thirty-two volumes a discount of 50 per cent. on the above prices.
For any more than thirty-two volumes a discount of 60 per cent. on the above prices.

The NATIONAL FORMULARY, published by the Association in 1888, is sold at the following prices, including postage: bound in cloth, 75 cents; cloth, interleaved, $1.10; cloth, raised nails (for use in the laboratory), 90 cents; sheep, $1.10; sheep, interleaved, $1.25. For sale by the Authorized Agents of the Association, by wholesale druggists and book sellers.

All orders for Proceedings should be addressed to the Permanent Secretary, John M. Maisch, 143 North Tenth street, Philadelphia, Pa.

The price of the nickel badge has been reduced by vote of the Council to 25 cents, on receipt of which sum by the Permanent Secretary the badge will be sent by mail.

The Thirty-eighth Annual Meeting will be held at Old Point Comfort, Va., on the second Monday, eighth day of September, 1890, at 3 o'clock p. m.

Blank forms for recommendations for membership may be obtained from the Permanent Secretary or from the Committee on Membership. Such recommendations should reach the Secretary of the Committee, George W. Kennedy, Pottsville, Pa., at least one week before the meeting; if sent later, they should be addressed to the Council of the American Pharmaceutical Association, in session at Old Point Comfort, Va.

According to an arrangement made by the chairmen of several of the Secsions, the lists of queries have not been printed as part of the Proceedings, but a copy of the queries will be mailed with the present volume to every member of the Association.

MINUTES

OF THE

THIRTY-SEVENTH ANNUAL MEETING.

FIRST SESSION—MONDAY AFTERNOON, JUNE 24, 1889.

The Thirty-Seventh Meeting of the American Pharmaceutical Association convened in Eureka Hall, Odd Fellows' Hall, San Francisco, on Monday, June 24, 1889. More than a quorum being present, President Alexander called the meeting to order at 3:10 o'clock, p. m. Prayer was offered by Rev. Dr. Wm. H. Scudder, after which the Hon. Mr. Pond, mayor of the city of San Francisco, was introduced, and addressed the meeting as follows:

LADIES AND GENTLEMEN OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

On behalf of the city of San Francisco, it affords me pleasure to welcome you to our city and to thank you for making it the place of your meeting this year. We treat you, not as strangers, but as friends, coming from the various parts of our common country—from the land of our fathers away over the mountains, where most of us spent our earlier days, and of which we have fond recollections of the pleasant hours of youth. We fully realize the sacrifice which you have made in choosing San Francisco as the place of your meeting this year—the long distance that you have had to travel, over hills and valleys, mountains and prairies, to meet us, away on the western confines of the continent—and we greet you and welcome you with outstretched hands and warm hearts. Your profession is one that commends itself among all the commercial callings and to all mankind; as, while laboring for yourselves, you are doing much to minister to the comforts as well as the necessities of life. You, as representatives of the scientific ability found in the pharmaceutical profession, meeting for the laudable purposes of your organization, to improve the standard of your profession, commercial and scientific, are certainly warmly welcome by your co-laborers here, whom we honor and esteem as our neighbors; and as their friends I bid you welcome to the hospitality of our citizens, and believe and hope that you will find them fully equal to the occasion. You will, doubtless, find here old friends as well as new, and while I would not recommend you to believe all they tell you of this wonderful country of their adoption, still I hope that you will find your visit here not only profitable, but your intercourse with them full of pleasure, and that you will carry home with you only pleasant recollections of your visit here. Again I welcome you.

THE PRESIDENT.—Your Honor, most of the members here to day are strangers, and have visited the Pacific slope for the first time in the history of their lives. Now, when we are met at the very threshold of the city, the Golden Gate is rolled back, and we are invited to enter by one of California's distinguished citizens, we feel, just as you say, that we are strangers no longer, and in order that you may have a fitting response to your warm address of welcome, I will call upon Mr. Ebert, of Chicago, to respond.

MR. EBERT.—*Your Honor, Mr. President, Ladies and Gentlemen:* I do not know why the honor should have been bestowed upon me to respond to the hearty welcome of his Honor, the mayor of San Francisco, but I would say that after having listened to this welcome, I feel, and I know that feeling is shared by every one present, whether he has come a short distance or a long one, that we will be well repaid in our visit; that when we shall leave here we must confess the journey has been crowned with profit and pleasure, and that we will not regret to have come the distance. In behalf of the visitors. I thank you, gentlemen and ladies of the Pacific coast. We are glad that we have come among you, and I hope that we will leave as good an impression upon you as certainly has been made upon us in coming here. As I am not prepared at this moment to amply thank you for your hospitality, I simply will say that it is one of the crowning acts of the American Pharmaceutical Association to hold a meeting on the Pacific coast. For ten long years we have endeavored, year after year, to meet with you, and have striven to fulfil our promise and to comply with your invitation, but it is only one year ago that we succeeded in convincing the Association at large that we should come and meet you at this time. Deeply appreciating, Mr. Mayor, your proferred hospitality, I thank you once more on behalf of the Association.

President Alexander then introduced Dr. Melvin, President of the California Pharmaceutical Society.

DR. MELVIN.—Ladies and gentlemen, history informs us that some nineteen hundred years ago, certain wise men journeyed westward over a sandy desert, guided by the star of hope, in search of a promised Messiah. History, to some extent, repeats itself in your case, gentlemen of the American Pharmaceutical Association. You, too, represent the wise men of our chosen craft; you, too, have been guided by the star of empire, seeking a land of promise, the equal of which can only be found after we pass the other golden gate. As the executive officer of the California State Pharmaceutical Society, it affords me great pleasure to welcome you each and all to our Golden State, and we trust that your stay will be made satisfactory and pleasant. We shall do our share to show our gratification by acts of hospitality which shall at least convince you of our sincerity. Ever since Sir Francis Drake sailed through the Golden Gate and discovered the most beautiful bay in the world, people have visited California and have lauded its praises; and the citizens of the State—well, they are so enthusiastic in their praises that our Eastern friends are disposed to believe their praises are the emanations of disordered brains. But, gentlemen, now that you are here, I leave you to judge for yourselves of the many advantages of our "glorious climate," and view with your own eyes the magnificent scenery that attracts artistic pilgrims from all parts of the world, and, if you carry back kind memories of our State and its inhabitants, we shall be well satisfied with our part in the Convention of the American Pharmaceutical Association.

Again I desire to say to you, on behalf of our Association, that we bid you a cordial welcome.

THE PRESIDENT.—We are certainly under great obligations to you for your kind words of welcome, and I don't believe any of us will go away without appreciation of the beauties we have seen.

Vice-President Wilcox now occupied the chair, and the President read the following address:

It is with pleasure I offer my greeting to so many of my fellow members assembled together at the Thirty-seventh Annual Meeting of the American Pharmaceutical Association, held in this city of San Francisco, and the first ever held west of the Missouri River. It was feared, when the Association determined to meet on the Pacific Slope, that the attendance would be very small, owing to the time and expense that would necessarily be consumed by the members in making the trip; but in this we are happily disappointed. While we miss from their places many familiar faces we are accustomed to see, and regret their absence, yet the large increase of new members will make our meeting interesting and profitable.

I propose to make my address quite brief, for several reasons. It was not with the expectation that I would deliver an elaborate essay that I was elected your President, nor is it at this time necessary. Heretofore the President has been the "historiographer" of passing events, relating to the interest of the Association during the year. Now, the Reporter on the Progress of Pharmacy, and the Chairmen of the various sections, give complete reports upon all scientific, business and other matters relating to the Association; and again, as the Committee to whom was referred the exhaustive and scholarly address delivered by my predecessor, Mr. J. U. Lloyd, at the last annual meeting, was not acted upon for want of time to properly consider it, but will come before you for discussion at this meeting, I feel that a short address will not be a matter of regret at this time.

Our membership seems to be increasing every year, yet the amount received from annual dues remains at nearly the same figures, showing that the delinquents and those dropped from the list about equal our increase. I wish to say a word, right here, in regard to membership in this Association. It has been suggested and recommended, that members who are not apothecaries, or not actually engaged in dispensing medicine, should be denied the right to vote for officers, hold office, or take part in debate upon business. If the Association enact such a law, I think it would be disastrous, and soon lead to a dissolution of the Association. We would be robbing ourselves of the services of some of the most intelligent and energetic members. If we limit membership to apothecaries, I do not know where the Association will get its members, as there are at this day very few apothecaries, pure and simple; most of them carry quite as large a stock of goods outside of medicine as they do of medicine, such as perfumery, cosmetique, toilet articles, patent medicines, and a variety of other goods; I am free to confess that I want in this Association all who may be engaged in dispensing and preparing medicine, whether it be as an apothecary, or a manufacturing chemist, wholesale or retail druggist, or teacher in a college of pharmacy; and I would have them entitled to all the privileges of full membership, with perhaps, the exception of being entitled to hold the office of President, or the Chairmanship of the Council.

You will remember, some six years since, at a meeting held in Washington City, there was organized a National Retail Druggists' Association, whose object was to protect and consider the business interests of its members. Why was this Association formed? Simply because the American Pharmaceutical Association was thought to have made no provision for considering the business interests of its members; but as soon as our grand old Association said she would provide for all the interests of her members, and established a Section on Commercial Interests, the National Retail Druggists' Association ceased to exist; and I would not now disturb the relations of any members who may have come to us under the guarantee of that reorganization. This is the third year that we have been working under the reorganized rules effected at Cincinnati; and while they may not be

all that is desired, I think it better to continue upon the same lines, than make any radical change until a more thorough trial.

In a communication I received from the Treasurer, he calls attention to the fact that, for several years past, we have been spending for our current expenses more than our income. In 1886, we received from membership $5,220.00, and paid out $5,412.00; in 1887 received $5,195.00, and paid out $6,256; and this year our expenses will exceed our income by a considerable sum. We have for some years past been carrying over into the next year an item of $950.00 which properly belongs to the current year's expenses. This item is for the salaries of the Reporter on Progress of Pharmacy and the Secretary of Council. As the salaries of the other officers are paid when due, these gentlemen are entitled to theirs; consequently if this sum is paid this year, as it should be, we will find our treasury something over a thousand dollars short. While it is true that in 1887 we placed to the credit of the Life Membership Fund, the sum of $3,000, that was owing to the fact of $2,195.00 being paid in by a former officer, and an unprecedented amount of delinquent dues collected by a systematic Treasurer. Let us live within our income.

Before the next annual meeting of this Association, the seventh Decennial Convention for revising the United States Pharmacopœia will commence its sessions, and its President has issued notice to this Association to elect a number of delegates, not exceeding three, to assemble in Washington City on the first Wednesday in May, 1890. This will be the first time the American Pharmaceutical Association, as a body, has had representation in the Conventions for the revision of the Pharmacopœia. It was at the Convention of 1880 that this body was, by resolution invited to send delegates; before that year, I believe only incorporated Associations were invited.

This is probably one of the most important conventions that assemble in this country; and I think not least among the subjects that will come before it, is whether the metric system of weights and measures shall be adopted as the standard system in the United States, and place our Pharmacopœia in accord with the authorized editions of other advanced nations of the world. England and the United States, I believe, are the only two nations of importance, that have not as yet incorporated this system into their national works, and these two nations do not agree with each other in their system of weights and measures. While I would recommend the adoption of the metric system, I would not recommend the dropping of the parts by weight as used in 1880. I think if the metric system is adopted, it will be of interest to all apothecaries. It will familiarize and induce them to keep full sets of metric weights and measures in their dispensing departments, and do away with the troublesome, and to some difficult, practice of reducing the metric system to the ordinary weights and measures now in use. Other important matters will come up, but they may be left to the standing committee on the revision of the Pharmacopœia, whose duty it is to collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention, who will make their report to you in its regular order.

The American Medical Association meets in Newport upon the 26th of this month; and I am informed that they will have under consideration a project that will be of interest to this Association. It is contemplated to form a section on Pharmacy; to what this may lead, or what particular advantage it may be to the pharmacist, I am not prepared to say; but as we have a Committee appointed to visit the American Association in the interest of the National Formulary, I have appointed this same committee to look into the merits of this proposed section, and report by telegraph to us at this place, if they think necessary.

We have now Boards of Pharmacy in thirty-one States, and most of them are doing good work in raising the standard of pharmacy, and educating the community to discriminate in favor of the educated pharmacist. Care will have to be observed by members of

Boards in conducting their examinations of applicants for registration. I do not think it ever was the intention of State legislatures, in creating Boards of Pharmacy, that the examinations should be of a technical character; but rather that the Board, by examination, should discover whether the applicant had sufficient knowledge, experience, and intelligence to conduct a drug store in a safe and proper manner. There appears to be great difficulty in getting State legislatures to create pharmacy laws. I think if there was a little judicious advertising before the meeting of legislatures, circulated throughout the State, giving the people a correct idea of the uses of such a Board, and showing that it was for their protection, and not to put money into the pockets of the Board, there would be less opposition. I do not think that Boards of Pharmacy will attain their full efficiency, or receive the hearty co-operation of the druggists themselves, until the system by which they are now supported is changed, and the State makes an appropriation to pay the necessary expenses of the commissioners. Much of the opposition to pharmacy laws comes from the druggists; they look with suspicion upon any enactment that assesses them with from one to five dollars per head, in addition to their regular taxes, in order to carry on their business.

At the last meeting of our Association, notice was given that a resolution would be offered to amend Section 7, Chapter 9, of the By-Laws, so that the sections on Legislation and Pharmaceutical Education should be consolidated; the notice, however, was withdrawn. I would recommend that the notice be renewed, as the sections are so closely allied that they would be better merged into one.

Many members of the Association, particularly the most recent ones, are unacquainted with the meaning and origin of what are called Invested Funds—the Ebert, Centennial, and Life Membership Fund. Would it not be well to have a page placed in each journal of our Proceedings, giving the value in money from date of last report, a brief history of origin, and the use to which the proceeds of each Fund mav be applied? This page might be placed immediately after the page giving the names of the members of the Council. The Life Membership Fund is referred to in the Constitution, and the Centennial Fund in the By-Laws of the Council, in so far as the disposition of the proceeds of each fund is concerned; but nowhere do I find anything in regard to the Ebert Fund. I would recommend that the Secretary be authorized to have such a page placed in the journal.

With these two recommendations, and thanks for your attention, and the many courtesies that I have received at your hands, I will bring my address to a close.

M. W. ALEXANDER, *President.*

On motion of Mr. Simmon, the President's annual address was received and ordered to be referred to a committee of five, to be appointed by the chair, for consideration, and report on the suggestions contained therein.

President Alexander resumed the chair, and the Secretary read the following letter:

SAN FRANCISCO, *June 24th, 1889.*

PROF. JNO. M. MAISCH, *Sec'y A. P. A., Odd Fellows' Hall, City.*

Dear Sir: Acting in behalf of President Kelly and the members of the National Wholesale Druggists' Association, we desire to extend to your Association our greetings and best wishes for the success of the meeting now being held under your auspices in this city.

We hope your visit here may be a pleasant one, and the convention result in strengthening the bond of good-fellowship and coöperation now existing between the members of your Society.

Yours truly,

REDINGTON & CO.

On motion, the letter was received and ordered to be acknowledged by the Secretary. The same action was also taken on the following letter read by the Secretary:

CALIFORNIA STATE BOARD OF TRADE, *605 Market St., San Francisco, Cal., June 24th, 1889.*

To the President and Members of the Pharmaceutical Association—Greeting.

The California State Board of Trade heartily invite you to visit its rooms at any time during your sojourn in the city, to view the products of the several counties of the state.

Very respectfully yours,

JNO. Q. BROWN, *General Manager.*

Mr. Kennedy, Secretary of the Council, reported the names of forty-nine candidates duly proposed for membership in compliance with the By-laws, all of whom were elected.

The Secretary read the list of delegations, the credentials having been examined by the Council, showing that delegates to the present meeting had been accredited as follows:

Colleges of Pharmacy: California, Chicago, Cincinnati, Illinois, Louisville, Maryland, Massachusetts, National (Washington, D. C.), New York, Philadelphia and St. Louis.

State Pharmaceutical Associations: Alabama, Arkansas, Calfornia, Connecticut, Dakota (South), Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, Virginia, and Wisconsin.

Local Associations: Dauphin Co., Pa.; Detroit, Mich., and St. Louis Microscopists.

Alumni Associations of Colleges of Pharmacy: California, Chicago, Cincinnati, Philadelphia, and St. Louis.

The following letter was read by the Secretary and accepted:

MINNEAPOLIS, *June 15th, 1889.*

JOHN M. MAISCH, ESQ., *Sec'y A. P. A.*

My Dear Sir: I have the pleasure to advise you that the following firms, members of our Association residing at San Francisco, are appointed as delegates to the meeting of the American Pharmaceutical Association, at San Francisco, June 24th:

REDINGTON & CO.,
LANGLEY & MICHAEL,
J. J. MACK & CO.

Hoping the A. P. A. will have a pleasant and profitable meeting and the individual members a safe and pleasant journey, I remain, Yours truly,

A. B. MERRIAM, *Sec'y.*

Letters were read by the Secretary from S. Lachman & Co., and from the Purity Wine Co., of California, inviting the members and their visiting friends to visit their stores and wine-vaults. The process of purifying and ageing wines by electro-magnetism, was stated to be in full operation. The invitations were accepted, and directed to be acknowledged by the Secretary.

Reports of Committees being called for, the following were read by title and laid upon the table for future consideration: On prize essays;

on revision of the U. S. Pharmacopœia; on arrangements; on visit to the National Wholesale Druggists' Association; and on the National Formulary.

Mr. Kennedy read the minutes of the Council since the Detroit meeting, which, on motion, were duly approved. Besides the action taken on the report of the Committee on Prize Essays for 1887, which was published on page 602 of last year's Proceedings, the following business was transacted by the Council after the adjournment of the Detroit meeting:

February 15, 1889. Emlen Painter moved that the sum of five hundred dollars ($500) be appropriated from the funds of the Association to defray the necessary expenses of the Committee on Arrangements in making preparations for the meeting in San Francisco Cal., June 24th, 1889.

To bring the above motion properly before Council, it was seconded by J. M. Maisch.

The resolution was passed by nine affirmative votes, while six members of Council voted nay, and two members desired to be excused from voting.

March 23, 1889. It was moved by S. A. D. Sheppard and seconded by J. M. Maisch:

1st. That the Rules of Finance be so far suspended as that the Treasurer and Chairman of the Council shall be instructed to close their books May 1, 1889, and send them to the Examining Committee as soon after that date as possible.

2d. That the Secretary be instructed to close his National Formulary accounts at same date, and send them to the Examining Committee as above.

This motion was unanimously adopted.

Chairman Good appointed the following Committee to examine the books of the Treasurer and the Permanent Secretary's accounts of the National Formulary: Wm. Dupont, Jas. Vernor, and Arthur Bassett, of Detroit.

SECOND SESSION OF COUNCIL—PALACE HOTEL, SAN FRANCISCO, JUNE 24TH, 9 A. M.
(7 members present.)

During the temporary absence of Vice-Chairman Painter, M. W. Alexander was called to the chair. The minutes were read and approved.

The Secretary of the Committee on Membership presented the names of 49 candidates; on motion, they were recommended to the Association.

L. C. Hopp was appointed a Committee to examine, with the Permanent Secretary, the credentials of accredited delegates to the present meeting. A list of delegations was subsequently reported (see page 6) and accepted.

The following report was read and approved:

REPORT OF THE COMMITTEE ON PUBLICATION.

The volume containing the Proceedings of the meeting held at Detroit, was promptly published and distributed to the members entitled, during the month of January. It contains a reprint in full of the National Formulary, which has increased the cost of the volume by the amount of $108.90, irrespective of the increase in postage for distributing, which will amount to about $50 more.

The Proceedings for 1888 make a volume of 722 pages, and with the Formulary 910 pages. The expenses for publishing and distributing this volume, and for insuring the property of the Association, were as follows:

Proceedings:	Phonographic Report	$150 00	
	Composition, paper, and press work	1419 54	
	Reprints of queries, papers, etc.	8 70	
	Binding and wrapping	318 25	
	National Formulary as part of the volume.	108 90	
	Freight	4 75	
			$2010 14
Journals for use of Reporter of 1888		$25 52	
" " 1889		12 37	
			37 88
Other expenses of the Secretary:	Wood cuts	$4 00	
	Telegrams	2 72	
	Circulars, etc.	37 75	
	Packing boxes	50	
	Freight and expressage.	33 07	
	Postage stamps	403 70	
	Binding old volumes	12 00	
			493 74
Premium for fire insurance (German F. I. Co., Phila.)			15 00
Salaries of Reporter and Secretary.			1500 00
Total			$4056 77

The increase in the above expenses as compared with the preceding year amounts to $247.25. This is in part due to the re-publication, with last year's volume, of the National Formulary, which item, as stated before, amounts to about $158, the balance of the increase, about $90, being caused by the change inaugurated during the past year in the manner of distributing the volume.

The stock of Proceedings on hand and stored at the Philadelphia College of Pharmacy is as follows:

1851.	285 in paper.			1871.	95 in paper.	50 bound.
1852.	69 "			1872.	89 "	10 "
1853.	70 "			1873.	18 "	92 "
1854.	43 "			1874.	130 "	17 "
1855.	86 "			1875.	65 "	39 "
1857.	241 "	10 bound.		1876.	42 "	49 "
1858.	54 "	9 "	115 loose.	1877.	48 "	86 "
1859.		26 "		1878.	60 "	111 "
1860.		195 "		1879.	18 "	94 "
1862.		264 "		1880.	82 "	50 "
1863.		253 "		1881.	55 "	29 "
1864.	174 "	101 "		1882.	48 "	75 "
1865.	150 "	14 "		1883.	42 "	130 "
1866.	66 "	65 "		1884.	50 "	202 "
1867.	148 "	72 "		1885.	110 "	235 "
1868.	57 "	138 "		1886.	62 "	266 "
1869.	98 "	134 "		1887.	60 "	201 "
1870.	107 "	83 "		1888.	71 "	188 "

The Committee desires to direct the special attention of every member of the Association to the reduction in the price of the older volumes of the Proceedings, as stated in

the Prefatory Notice (page xxi.) of the last volume. It will be seen from the Treasurer's report that several members have availed themselves of this offer, and completed their sets of Proceedings, and it is to be hoped that others may do likewise, and thus secure a serial of publications which will be valuable for reference for many years to come.

The expenses incurred and income derived from the publication of the National Formulary as a separate volume will be found in a statement prepared for, and verified by, the Auditing Committee. It is sufficient to state here, that for this item all the expenses incurred by the Association—including the cost of the copies furnished free of charge to the members of 1887, and to others; likewise the total expenses of the Committee on the National Formulary since 1885—have been paid back into the treasury; that an amount in excess of the total expenses has been received; and that a stock remains on hand which will yield a further income to the Association. This favorable result has been largely due to the advantageous terms secured by the Committee for the printing and binding of the Formulary, which enabled them to distribute the book without additional expense for the labor in packing, and that no expenses were incurred—postage excepted—for keeping the accounts and carrying on the necessary voluminous correspondence.

Respectfully submitted for the Committee on Publication,

JOHN M. MAISCH,
LEWIS C. HOPP,
FREDERIC WILCOX.

Mr. Kennedy read the following report, which was accepted.

REPORT OF THE COMMITTEE ON MEMBERSHIP.

To the Chairman and Members of the Council of the American Pharmaceutical Association:

GENTLEMEN.—The Secretary of the Committee on membership would respectfully submit this report for your consideration and disposal. In compliance with instructions received at the first session of Council held last year in the city of Detroit, the Secretary of the Committee on Membership sent to all the members of the Association in the early part of May last, a circular showing clearly the method of admitting new members, together with a blank proposition for membership.

Under the new system of receiving members into our Association, the total number recommended at Detroit was 205, representing 25 states, also Canada, and Central America. The first year's trial of the new method was not satisfactory, as but thirty-three (33) of the 436 invited at the Cincinnati meeting to join our organization made their membership good. This year it is very gratifying for me to be able to report that 106 of the 205 proposed and invited have completed their membership.

Since the publication for the Proceedings for 1888, the following gentlemen proposed at the Detroit meeting have completed their membership:

J. W. Deutsch, Cleveland, O.
M. M. Heller, " "
C. N. Schoenhut, " "
Jno. H. Winter, New York.
Chas. M. Zinck, Meadville, Pa.

REPORT OF MEMBERSHIP.

Members in good standing at last report	1257
" elected since last report	106
" received as delegates	10
Total membership	1373

LOSS IN MEMBERSHIP.

By resignation	34
Dropped from the roll for various causes	60
By death	16
Total loss	110
Number in good standing at this report	1263

HONORARY MEMBERSHIP.

Number on the roll same as last report 25

The Treasurer, S. A. D. Sheppard, has reported a list of 48 names of delinquent members who are liable to be dropped from the roll.

Of this number are in arrears 17 for 3 years, 17 for 4 years, 13 for 5 years, 1 for 6 years. The Treasurer believes very few of the reported will pay up. Since receiving the report, three of the delinquents have paid up, and probably others will do so before the next volume of Proceedings is issued.

During the year that has closed the ever-moving reaper of death has again called away from the labors of life some whose fellowship we have enjoyed, and by whose counsel we have profited. The following list includes all who have died since our last meeting, or that have been reported to the Committee. I would here request all members when they hear of the demise of any members of the Association, to notify the Secretary of the Committee on Membership at their earliest convenience.

Lorenz Blahnik, Chicago, Ill.
John Carle, Jr., New York, N. Y.
Wm. W. Dale, Chicago, Ill.
Charles E. Fougera, Brooklyn, N. Y.
Samuel S. Garrigues, Ann Arbor, Mich.
Hiram E. Griffith, Niagara Falls, N. Y.
Hugo R. Hartung, Denver, Col.
Thomas Jones, Brooklyn, N. Y.
Wm. J. Martin, Cincinnati, Ohio.
Archibald McClure, Albany, N. Y.
Charles A. Robbins, New York, N. Y.
Wm. S. Robinson, Yorkville, Toronto, Ont., Can.
David J. Sewall, Boston, Mass.
Wm. S. Sweet, Warsaw, N. Y.
S. D. Smith, Reading, Pa.
Benjamin Ward, Mobile, Ala.

Lorenz Blahnik was born at Malo Rolenka, Bohemia, December 28th, 1845. He attended the high school (Gymnasium) at Klattau from 1857 to 1862, after which he became an apprentice to the apothecary business at Blovitz, having served three years. He came to this country in the year 1866, and in Chicago was employed for two years by Messrs. Reuter and Fiske. In 1868 he went into business on his own account at 88 West 18th St., where he remained up to the time of his death, which occurred on the first day of August, 1888. He was esteemed and highly respected by his customers and the community for his honesty and professional ability, and by close attention acquired a large and profitable business. Deceased was elected a member of our Association at the meeting held in Kansas City, Mo., in 1881.

John Carle, Jr., probably the oldest druggist in the city of New York, died there October 28th, 1888, at the age of 84. He was born in Long Island, and at the age of 12 entered the drug store of his uncle, Silas Carle, then at Fulton and Water streets, and for 72 years he was identified with that business, though for the past four years he had practically withdrawn from active participation in its cares, having given it in charge of his only son. Mr. Carle's long life was marked by simple, unostentatious habits, a careful attention to business, a willingness to aid in all good objects, and by friendliness to

the needy. For many years he was identified with the New York College of Pharmacy as a Vice President and Trustee, and for more than a third of a century he was a Trustee of the Bowery Savings Bank. All through his long and useful life he enjoyed the confidence and esteem of all who knew him; and while he is sincerely mourned, yet his example and honorable career will be remembered as one who well and truly filled his sphere in life. Deceased was connected with our Association 28 years, having joined in 1860, at the meeting held in the city of New York.

Wm. M. Dale, of Chicago, died there in the latter part of 1887. Mr. Dale was born in Kilmarnock, Ayrshire, Scotland, forty-five years ago, and at a very early age was sent to learn the chemist's business. He served a short apprenticeship in a drug store in his native town, and then went to Glasgow, where he became thoroughly conversant with the details of his profession under the tutilage of Dr. Buchanan, one of the best known chemists at that time. When twenty-one years of age, young Dale determined to cut himself loose from the old country, and to carve out a career for himself by emigrating to America in 1863. Arriving in New York and remaining there but a short time, he proceeded to Chicago, and at once secured employment with Buck and Raynor, where he remained some years. By his untiring industry and rigid economy, he was soon able to go into business for himself, which he did by forming a partnership with John Heiland. For several years the firm did a thriving business on Clark St. Finally Heiland was bought out and deceased conducted the business alone, In 1879, he established himself at the corner of Clark and Madison Sts., employing four clerks; custom began to pour in upon him, and at the time of his death eighteen active young men were kept on the jump day and night to supply the wants of customers. It is acknowledged by those in position to know that he did, probably, the largest retail business in the United States. Deceased was regarded as a conscientious and reliable man. He leaves a widow, one son and four daughters. In 1880, at the meeting held at Saratoga Springs, he was elected a member of our Association.

Charles E. Fougera was born at Chateauroux, department de l'Indre, France, on May 23, 1821, and came to New York in 1846. He was a graduate of the University of France and of the New York College of Pharmacy, also a member of several pharmaceutical, philanthropical and scientific associations in this country and abroad. The foundation of his fortune was laid at 30 North William street, where he established, in 1849, the extensive business of importing French and other foreign medicinal preparations, in addition to manufacturing his own pharmaceuticals. The house is still in existence, under the name of E. Fougera & Co. In 1869 he founded the retail drug store on the corner of Atlantic avenue and Clinton street, Brooklyn. The Fougera apartment house in Brooklyn was erected at an expense of $600,000. He was thoroughly honest, of quiet demeanor, very domestic in his habits, and a humanitarian in every sense of the word. His last wishes were that his funeral be as simple as possible and that no flowers be used. Mr. Fougera became a member of our Association at the meeting held in New York city in 1867.

Hiram E. Griffith, of Niagara Falls, New York, died January 12, 1889, aged 51 years and 11 months, of heart trouble. Mr. Griffith was born in Drummondville, Ontario co., in 1837, but lived nearly his whole life at Niagara Falls, where he was educated in the village schools. He chose pharmacy as a profession, and after he was thoroughly prepared for business, opened a store for himself, remaining in the same location from the start. He was held in high esteem. He filled many important positions of trust, as president of the village, treasurer of the board of education, etc., in which positions he handled large sums of money. His wife and two sons are left to mourn his loss. In 1875 he was elected a member of our Association at Boston. The success of the meeting of 1882 was largely due to his efficient service as local secretary.

Samuel S. Garrigues, Ph. G., Ph. D., died at Ann Arbor, Michigan, after a protracted sickness, May 16th, 1889, in the sixty-first year of his age. Among the Huguenot exiles who left their homes in the province of Languedoc, in France, by reason of the revocation of the edict of Nantes by Louis XIV., in 1685, were three brothers, Matthew, Francis and John de la Garrigue. They escaped from France, and landed on the island of St. Christopher, which belongs to Great Britain, and from thence they went to Philadelphia. The family name in time became anglicized to Garrigues. The deceased was born in Philadelphia, September 7th, 1828. His early education was received in the school maintained by the Society of Friends. He afterwards entered the public schools of his native city, and graduated from the high school in 1847. His knowledge of pharmacy was obtained in the store of his father, Edward B. Garrigues, 10th and Fairmount avenue, and with the late F. L. John, on Race street above Third. Graduating from the Philadelphia College of Pharmacy in 1851, the same year he went to Europe; after a year spent at the university in Berlin, he entered the University at Göttingen, and after a course of two years, graduated from that institution, receiving the degree of Ph. D. During the vacations of his student life abroad, he made pedestrian trips through Germany and into Switzerland and Italy. Botany being one of his favorite studies, he collected during these excursions an extensive and valuable herbarium, which he afterwards presented to the University of Michigan. In 1854 he returned to Philadelphia, and, with Mr. Magee, engaged in the manufacture of chemicals for photography. After the firm dissolved in 1857, he removed to New York, where he remained until 1863, when the development of the salt interests in Michigan led to his connection with that industry as a chemist. In 1869 he was appointed State inspector of salt in Michigan, and held that office until his declining health made it necessary for him to withdraw from active duties. The reports prepared by him on the salt and lumber interests are valuable State papers on the resources of Michigan. As a member of our Association he was for many years very active, having served as Chairman of the Executive Committee and of the Committee on Sales of Poisons, a member of the Committee on Weights and Measures, also on the Committee on the Progress of Pharmacy. He contributed several very valuable and interesting papers on the following subjects: Bromine, and its production from the Saginaw Brines; St. Louis Medical Springs; Michigan Salt; American Bromine, and Insect Powder. After locating in Michigan, he took an active interest in the advancement of pharmacy in that State, was president of the Michigan Pharmaceutical Association, and was interested in the passing of the Pharmacy Act of that State. He was a member of the Franklin Institute and of the Academy of Natural Sciences in Philadelphia. He was married in 1864 to Miss Addie M. Burt, of Saginaw, Michigan. His widow, a son and a daughter survive him. In 1855 deceased became a member of our Association, and at the time of his death was a life member (old style).

Thomas Jones, of Brooklyn, N. Y., died there in February last, aged 53 years, of Bright's disease. Deceased was born in Wales, where he received a good education; after which he began the study of Pharmacy, and continued in the business up to the time of his death. Mr. Jones is spoken of as being a very skilled man in his profession, unassuming and very attentive to business. He united himself with us in 1868, at the meeting held in the city of Philadelphia.

Wm. J. Martin, one of the leading pharmacists of Cincinnati, Ohio, died February 7th, 1889. Mr. Martin was born in 1840, and entered the drug business when 18 years of age. For many years past he has been in business on his own account, and as Martin & Heiser, at 7th and Elm sts. In business and social circles he bore an unblemished reputation. He was an active member of the Ohio Pharmaceutical Association, and had served both as Secretary and President of the Cincinnati College of Pharmacy. Resolu-

tions of regret were adopted by the college. Mr. Martin was not married. His membership in our Association dates back from the meeting held in Kansas City, Mo., in 1881.

Archibald McClure, of Albany, New York, passed away at the age of 54 years. Mr. McClure was of Scotch-Irish decent, born in Albany in 1835, had but a moderate education, and entered the drug store of his father in 1852, becoming a partners in 1857, enlarging the business greatly, and adding to the firm, at later periods, his brother Wm. H. McClure, Wm. J. Walker and Charles Gibson. His personal character was marked on the side of Christian activity and benevolence. He was President of the Board of Governors of the Albany Hospital, a trustee of the Albany Medical College, a trustee of the College of Pharmacy, and Treasurer of the Old Ladies' Home, besides acting as a Director in a National Bank, a Savings Bank, and a Fire Insurance Company. His benevolence was proverbial, but unostentatious, and many homes were made happier by his thoughtfulness. A widow and one daughter survive him. Deceased became a member of our Association in 1880, at Saratoga Springs, N. Y.

Dr. Chas. A. Robbins, of New York, was born in Brooklyn thirty-four years ago, received his education in the Brooklyn Polytechnic Institute, and completed his studies at the Berlin University, where he took the degree of Ph. D. He also graduated from the New York College of Pharmacy. He was an expert chemist, and his knowledge in that line was of valuable assistance during his business career. His first commercial experience was in the house of McKesson & Robbins, and after becoming acquainted with the details he was given an interest in the firm and made several trips abroad for the house. He and his father, the late D. C. Robbins, worked together in extending the business of their respective departments, and the latter generally relied on the good judgment of his son, whom he would consult before giving a definite decision about any matter of importance; and Doctor Robbins, in turn, would solicit the matured opinion of his respected parent in determining commercial questions. In 1885 he withdrew from the firm of McKesson & Robbins, when he and his father entered into partnership, under the name of Robbins & Robbins, to manufacture quinine and chemicals, a large factory having been erected in Brooklyn for that purpose. Subsequently the firm name changed to the present style of the New York Quinine and Chemical Works, Limited, and last December the deceased severed his connection with it. In 1882 he married Miss K. R. Delano, daughter of Warren Delano, of Newburgh, N. Y. She and two children survive him. Dr. Robbins was elected a member of this Association in 1876, at the meeting held in Philadelphia.

William S. Robinson, of Yorkville, Toronto, Canada, was born in Grimsby, Lincolnshire, England, on March 3d, 1834. He was there apprenticed to a druggist, and, when about twenty years of age, came with his wife to Canada. He commenced business at Whitby, Ont., where he suffered loss by fire; then he went to Toronto and managed the business carried on by Mr. Robert Brumpton, at Yonge and Bloor streets, which business he acquired in 1867, removing immediately to some distance north, and ultimately to his last stand. He was one of the founders of the Ontario College of Pharmacy, and served in various capacities as an officer of that body. His death, which took place on February 25th, resulted from paralysis, and was very sudden. Deceased leaves behind him a widow, two sons and a daughter. He became a member of our Association at Toronto, Canada, in 1877.

David J. Sewall, of Boston, was born in Rockport, Mass., in 1844. About a year prior to his death, deceased fell over a defective sidewalk on Arcadia street, and broke his left wrist; about six months after, the wrist became swollen, and upon the advice of his attending physician he was moved to the city hospital, and a portion of the forearm was removed. The patient sank rapidly under the operation, and blood poisoning soon fol-

lowed, and resulted in his death. Mr. Sewall was a very prominent citizen, and was universally popular. He was the oldest established druggist in the district. Mr. Sewall was elected a member of our Association at the meeting held in Boston in 1875.

Wm. S. Sweet, of Warsaw, N. Y., was born Nov. 23, 1856, in the village of Pike, N. Y. After serving a regular apprenticeship with a good pharmacist, one who was strict and trained his students well for business, he engaged himself with Mr. Lathorp and remained with him two years. He subsequently clerked in Castile and Randolph. In the year 1886 he started in business for himself, which proved very successful, as the result of persistent effort to build up a good trade. His health failed him, when diabetes set in, causing his death January 28th, 1889. Deceased took a great interest in his business, and was constantly experimenting in chemistry and pharmacy. His genial and frank manner won the confidence of all who knew him. Mr. Sweet became a member of our Association at the meeting held in Niagara Fallls, N. Y., 1882.

Stephen Douglas Smith, of Reading, Penna., died there of Bright's disease, aged 32 years. He learned the drug business with P. M. Ziegler, of Reading, attended lectures at the Philadelphia College of Pharmacy and graduated in 1883, after which a partnership was formed with his preceptor, under the firm name of Ziegler and Smith, in Reading, which was continued up to the time of his death. In business he was very successful, which was principally due to his kind and courteous disposition. Deceased was a member of the Pennsylvania Pharmaceutical Association, and joined our Association at the meeting held in Washington, D. C., in 1883.

Benjamin Ward, of Mobile, Ala., was born in Nottoway Co., Va., December 25th, 1844; he was raised in Green Co., Ala. In 1861, when a boy, he entered the drug store of his uncle, A. Stollenwerck, Greensboro, Ala., where he remained until he completed his apprenticeship. In 1805, he removed to Mobile, where he was engaged as a clerk until he worked himself up to an interest with his employer, O. H. Cowthan. In 1874, he sold his interest and went to Dallas, Texas, where he opened a drug store, which he sold next year and returned to Mobile, purchasing the store in which he was a partner, and continued the business until his death, which occurred December 15th, 1888, of heart disease. Deceased had the reputation of being a skillful pharmacist, and a highly respected and honored citizen. Two years ago, at the meeting held in Cincinnati, he became a member of our Association.

In conclusion, I desire to return my thanks for the many kindnesses shown by the officers and members of the Association, in obtaining data for preparing obituaries.

Respectfully submitted, GEO. W. KENNEDY,
Sec'y Committee on Membership.

The following reports were read, together with the accompanying documents, and on motion were accepted and approved:

DETROIT, *May* 22, 1889.

To the Council, A. P. A.

GENTLEMEN:—The undersigned having been appointed an Examining Committee, respectfully report that they have examined the books of the Permanent Secretary, Mr. John M. Maisch, and find that his report accompanying this, is found correct; with the exception of one item of four and $\frac{40}{100}$ dollars ($\$4\frac{40}{100}$)—he, the Secretary, having remitted that amount to the Treasurer twice, as explained in the letter attached to this report.

WM. DUPONT, *Ch. Ex. Com.*,
JAMES VERNOR,
ARTHUR BASSETT.

PHILADELPHIA, *May* 4, 1889.

Mr. Wm. Dupont, Detroit.

DEAR SIR:—There is a discrepancy between the Treasurer's figures and my own, amounting to $4.40. This amount has been paid twice by me, once by remittance of

original check under date of April 18th, and again included in my own check of April 30th. I only ascertained this last night, and regret that the Treasurer's receipt for same has been mislaid. You will observe from the cash book that all checks and drafts received by me were at once forwarded to the Treasurer, while moneys received in cash through money order or postage stamps, were remitted to the Treasurer by personal checks from time to time. The check for $4.40 received from the Druggists' Circular was remitted to the Treasurer April 18th, but I omitted to give myself credit for this remittance in my cash book, and through the misplacing of the receipt I failed to notice this oversight of mine until it was too late for correcting it between the Treasurer and myself. Very truly yours,

J. M. MAISCH.

SUMMARY OF COST OF, AND RECEIPTS FROM, SALES OF NATIONAL FORMULARY.

I. EXPENSES.

Stereotype plates	$423 37
Printing 12,033 copies, binding 10,633 copies, freight, postage, circulars, and insurance	3016 92
Total expenses paid to April 30, 1889	$3440 29

II. RECEIPTS.

1. From 39 authorized agents	$731 03
2. From 45 dealers, not agents	3335 29
3. From office sales	74 80
Total receipts to April 30, 1889	$4141 12

III. REMITTANCES TO TREASURER.

From July 13, 1888, to April 30, 1889, as per Treasurer's receipts	$4145 52

IV. BILLS RECEIVABLE.

From 13 authorized agents	$267 46
From 11 dealers not agents	286 40
Total amount received	$553 86

V. BILLS PAYABLE.

Expressage on Formulary sold	$11 60
Binding 500 copies	70 00
Postage, stationery, and expressage	18 08
Total amount payable	$99 68

VI. STOCK ON HAND.

Copies in sheets	900
" cloth	668
" cloth interleaved	275
" cloth, raised nails	32
" sheep	260
" sheep interleaved	114
Total copies on hand	2249

VII. COPIES FOR MEMBERS AND COMPLIMENTARY COPIES.

Sent to members from first edition	1037 cloth.	1 raised nails.	
" " from later editions	110 "		
" Congressional Library	2 "		2 sheep.
" Pharmaceutical Journals	29 "		
" Medical Journals	24 "		
" Colleges and foreign Associations	24 "		
" State Pharmaceutical Associations	37 "		
" State Medical Societies	30 "		
" Members of National Formulary Com.			39 sheep.
" Correspondents of Formulary Com.			43 "
Total copies sent gratuitously	1293 cloth,	1 nails.	84 sheep.

Value at wholesale prices of members' and complimentary copies—

1293 copies cloth	$646 50
1 raised nails	60
84 sheep	61 60
Total value at wholesale prices	$708 70

VIII. EXPENSES OF NATIONAL FORMULARY COMMITTEE SINCE 1885.

See Proceedings 1887, p. 444, Circulars		$9 00
" " p. 457, Treasurer's checks 5, 12, from Centennial Fund	$44 05	
" " p. 457, fr6m Centennial Fund, Treasurer's checks 15, 29	140 50	
		184 55
" 1888, pp. 24 and 25, from Centennial Fund, Treasurer's checks 38, 42	$52 75	
" " pp. 24 and 25, Treasurer's checks 52, 57, 59, 70, 71, 72	87 22	
		139 97

In part reported by National Formulary Committee in Proceedings 1888, pp. 38 and 39, paid since July 1, 1888:

Secretary's Order 396, preparations (Treasurer's check 77)	$22 16	
" 397, expenses (Treasurer's check 78)	37 54	
" 408, preparations (Treasurer's check 89)	10 50	
" 412, glassware (Treasurer's check 93)	69 84	
" 413, preparations (Treasurer's check 94)	3 40	
" 414, preparations (Treasurer's check 95)	3 20	
" 415, expenses (Treasurer's check 96)	59 86	
" 418, expenses (Treasurer's check 99)	30 17	
" 423, packing paper, etc., for preparations (Treasurer's check 105)	2 50	
" 424, printing for preparations (Treasurer's check 106)	2 50	
		241 67
Total expenses of Committee on National Formulary, first issue		$575 19

JOHN M. MAISCH, *Permanent Secretary*.

Philadelphia, May 1, 1889.

DETROIT, MICH., *May* 22, '89.

To the Council, A. P. A.

GENTLEMEN: Your Committee appointed to examine the invested funds and cash in the hands of the Chairman of the Council, respectfully report that they have examined the books, bonds and savings bank account, and find the "Ebert," "Centennial" and "Life Membership" funds are correct, as found in the accompanying report of the Chairman, Mr J. M. Good.

WM. DUPONT, *Ch. Ex. Com.*,
JAMES VERNOR,
ARTHUR BASSETT.

ST. LOUIS, *May* 1st, 1889.

The invested funds in the hands of the Chairman of the Council consist of the following.

EBERT FUND.

U. S. Registered 4 per cent. Bond, $100, No. 160603	$129 50	
" " 500, " 67880	647 50	
Cash Savings Bank, Dover, N. H.	34 78	
		$811 78

CENTENNIAL FUND.

U. S. Registered 4 per cent. Bond, $1000, No. 145640	$1295 00	
" " 100, " 160604	129 50	
Cash Savings Bank, Dover, N. H	75 07	
		$1499 57

LIFE MEMBERSHIP FUND.

U. S. Registered 4 per cent. Bond, $1000, No. 145639	$1295 00	
" " 1000, " 145761	1295 00	
" " 1000, " 145762	1295 00	
" " 100, " 160605	129 50	
" " 100, " 160606	129 50	
" " 100, " 160711	129 50	
" " 100, " 160712	129 50	
" " 100, " 160713	129 50	
" " 100, " 160714	129 50	
" " 100, " 162830	129 50	
" " 1000, " 150826	1295 00	
" " 1000, " 150827	1295 00	
" " 1000, " 150828	1295 00	
" " 100, " 164429	129 50	
" " 100, " 164430	129 50	
" " 100, " 164431	129 50	
" " 100, " 165415	129 50	
Cash Savings Bank, Dover, N. H	515 91	
		$9710 41
Total invested funds		$12021 76

Signed, J. M. GOOD.

FUNDS.

The Committee find on examination of the books of the Chairman of the Council, Mr. J. M. Good, and the Bank books, as also the bonds accompanying them, that the funds are as follows:

EBERT FUND.

U. S. Registered 4 per cent. Bond, $100, No. 160603		$129 50	
" " 500, " 67880		647 50	
Cash in Savings Bank, Dover, N. H.		34 78	
			$811 78

CENTENNIAL FUND.

U. S. Registered 4 per cent. Bond, $1000, No. 145640		$1295 00	
" " 100, " 160604		129 50	
Cash in Savings Bank, Dover, N. H.		75 07	
			$1499 57

LIFE MEMBERSHIP FUND.

U. S. Registered 4 per cent. Bond, $1000, No. 145639	$1295 00	
" " 1000, " 145761	1295 00	
" " 1000, " 145762	1295 00	
" " 100, " 160605	129 50	
" " 100, " 160606	129 50	
" " 100, " 160711	129 50	
" " 100, " 160712	129 50	
" " 100, " 160713	129 50	
" " 100, " 160714	129 50	
" " 100, " 162830	129 50	
" " 1000, " 150826	1295 00	
" " 1000, " 150827	1295 00	
" " 1000, " 150828	1295 00	
" " 100, " 164429	129 50	
" " 100, " 164430	129 50	
" " 100, " 164431	129 50	
" " 100, " 165415	129 50	
Cash in Bank, Dover, N. H.	515 91	
		$9710 41

RECAPITULATION—INVESTED FUNDS.

The Ebert Fund	$811 78	
" Centennial Fund	1499 57	
" Life Membership Fund	9710 41	
Total		$12021 76

Signed, WILLIAM DUPONT,
JAMES VERNOR.

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, JULY 1, 1888, TO MAY 1, 1889.

RECEIPTS.

Cash on hand July 1, 1888		$2376 07
Received from the sale of 9 Certificates @ 5.00		45 00
Received from the sale of 8 Certificates @ 7.50		60 00
Received from the sale of Proceedings		190 63
Received from the Ebert Fund		24 00
Received from Life Membership Fees, viz.,		
Louis Woltersdorff	$40 00	
Edward L. Milhau	20 00	
George J. Seabury	60 00	
		120 00
Received from Interest on Deposit in New Eng. Trust Company, Boston		36 15
Received for Annual Fees, 1884	$15 00	
Received for Annual Fees, 1885	60 00	
Received for Annual Fees, 1886	235 00	
Received for Annual Fees, 1887	490 00	
Received for Annual Fees, 1888	3220 00	
Received for Annual Fees, 1889	1050 00	
		5070 00
Received from National Formulary		4145 52
Total		$12067 37

DISBURSEMENTS.

1888.			
July	24.	Check No. 76. Inquirer Printing & Publishing Company, National Formulary	$207 36
		Check No. 77. Joseph P. Remington, National Formulary	22 16
		Check No. 78. Charles Rice, National Formulary	37 54
		Check No. 79. Guarantee Company of North America, Premium on Treasurer's Bond	50 00
	30.	Check No. 80. Inquirer Printing & Publishing Company, National Formulary	467 50
		Check No. 81. John M. Maisch, National Formulary	190 64
		Check No. 82. Inquirer Printing & Publishing Company, National Formulary	207 36
August	9.	Check No. 83. William H. Rogers, Expressage and Bonds.	7 70
	21.	Check No. 84. Inquirer Printing & Publishing Company, National Formulary	591 82
	25.	Check No. 85. Inquirer Printing & Publishing Company, National Formulary	207 36
		Check No. 86. George W. Kennedy, postage stamps	13 00
		Check No. 87. Standard Publishing Company, Printing and Stationery	11 88
	29.	Check No. 88. John M. Maisch, National Formulary	23 80
		Check No. 89. Charles Rice, National Formulary	10 50
		Check No. 90. John Harriott, Medals	50 00

September	5.	Check No. 91.	Joseph W. Colcord, postage stamps.	$2 50
		Check No. 92.	H. M. Whelpley, postage stamps	4 50
		Check No. 93.	Whitall, Tatum & Co., National Formulary.	69 84
		Check No. 94.	D. S. Cameron, National Formulary	3 40
		Check No. 95.	E. M. Wells, National Formulary	3 20
		Check No. 96.	Charles Rice, National Formulary	59 86
		Check No. 97.	C. Lewis Diehl, Salary as Reporter on Progress of Pharmacy (87 to 88).	750 00
		Check No. 98.	George W. Kennedy,— Salary as Secretary of Council (87 to 88) . . . . $50 00; Salary as Chairman Com. on Membership (87 to 88). 150 00	200 00
	6.	Check No. 99.	A. B. Stevens, National Formulary	30 17
	19.	Check No. 100.	Cyrus R. Morgan, services as stenographer.	150 00
	22.	Check No. 101.	James Vernor, use of Hall for meeting at Detroit	200 00
		Check No. 102.	John M. Maisch, sundry expenses	84 58
	29.	Check No. 103.	Mills, Knight & Co., Printing and Stationery	17 45
October	1.	Check No. 104.	John Carle & Sons, National Formulary .	2 50
		Check No. 105.	The Retail Grocers' Publishing Company, National Formulary	2 50
		Check No. 106.	Inquirer Printing and Publishing Company, Committee on Papers and Queries	15 50
		Check No. 107.	Inquirer Printing and Publishing Company, National Formulary	522 50
	6.	Check No. 108.	Winkley, Dresser & Co., Printing and Stationery	68 50
	13.	Check No. 109.	Iuquirer Printing & Publishing Company, National Formulary	53 33
	25.	Check No. 110.	Inquirer Printing & Publishing Company, National Formulary	207 36
November	5.	Check No. 111.	John M. Maisch, Sundry Expenses. $33 45; National Formulary 30 84	64 29
	13.	Check No. 112.	S. A. D. Sheppard, Sundry Expenses . .	82 43
	23.	Check No. 113.	Standard Publishing Company, Printing & Stationery	23 30
December	14.	Check No. 114.	Inquirer Printing & Publishing Company, National Formulary.	208 89
1889.				
February	19.	Check No. 115.	John M. Maisch, National Formulary . .	13 16
	19.	Check No. 116.	John M. Maisch, Sundry Expenses . . .	376 33
	21.	Check No. 117.	John M. Maisch, Journals for Reporter on Pharmacy	25 52
	21.	Check No. 118.	American Surety Company, Premium on Treasurer's Bond	50 00
	21.	Check No. 119.	Inquirer Printing & Publishing Company, National Formulary	85 00
	21.	Check No. 120.	Inquirer Printing & Publishing Company, Proceedings	1860 14

March	5.	Check No. 121. Winkley, Dresser & Co., Printing and Stationery	70 05
	30.	Check No. 122. S. A. D. Sheppard, Salary as Treasurer (1888 to 1889)	600 00
		Check No. 123. John M. Maisch, salary as Perm. Sec'y (1888 to 1889)	750 00
		Check No. 124. John M. Maisch, Sundry Expenses	72 20
		Check No. 125. Enno Sander, Committee of Arrangements.	21 50
		Check No. 126. Emlen Painter, Committee of Arrangements	114 76
April	12.	Check No. 127. S. A. D. Sheppard, Sundry Expenses	13 04
September	15, '88.	Life Membership Fund	40 00
	28, '88,	" "	20 00
December	22, '88,	" "	60 00
	31, '88,	Edward Kremers—Ebert Prize.	24 00
		Total disbursements	$9120 92
		Cash on hand, May 1, 1889	2946 45
			$12067 37

SUMMARY OF DISBURSEMENTS.

Use of Hall at Detroit meeting	$200 00
Stenographer at Detroit meeting	150 00
Medals at Detroit meeting	50 00
Expense of attendance at Detroit meeting of Secretary and Treasurer	101 25
Insurance	15 00
Journals for Reporter on Pharmacy	25 52
Premiums on Treasurer's Bonds	100 00
Printing and Stationery	211 18
Committee on Papers and Queries	15 80
Committee of Arrangements	136 26
Miscellaneons Expenses, Mailing and Distributing the Proceedings, Expressage, etc., etc.	553 48
Printing and Binding Proceedings (Check No. 120)	1860 14
Salaries	2300 00
Amount of Current Expenses	$5718 33
National Formulary	3258 59
Life Membership Fund	120 00
Ebert Prize	24 00
Total Disbursements	$9120 92

Of the cash in the Treasury the sum of $314.15 belongs to the Account of the Committee on Arrangements, as per following statement:

ACCOUNT OF COMMITTEE ON ARRANGEMENTS.

DR.

Cash on hand, July 1, 1888	$440 51
Interest	9 90
	$450 41

Cr.

Bill of Ennu Sander, Check No. 125	$21 50
" " Emlen Painter, Check No. 126	114 76
Cash on hand	314 15
	$450 41

PROSPECTIVE ASSETS.

Not counting the amount due from members whose names will probably be dropped from the Roll this year, the Prospective Assets of the Association are as follows:

Annual Dues for 1885	$10 00
" " " 1886	35 00
" " " 1887	110 00
" " " 1888	300 00
" " " 1889	4580 00
	$5035 00

Of course it is to be expected that some portions of the above amounts will prove worthless.

The Treasurer would call attention to the fact that the expenses of the Association exceed its income.

This statement will doubtless cause surprise when it is remembered that $7,000 has been paid from the Treasury into the Life Membership Fund. See Proceedings 1887, page 457, and Proceedings 1888, page 25.

But there are three other facts also to be considered in this connection:

First. The very large amount of $10,105 was due the Association July 1, 1886, for Annual Fees. See Proceedings 1887, page 445.

Second. Ex-Treasurer Tufts paid into the Treasury $2,195. See Proceedings 1888, page 24.

Third. The arrearages, so large July 1, 1886, have mostly been collected, or disposed of in some way, as will be shown by an examination of this report of the Treasurer, for not counting the members to be dropped and not counting the 1889 dues yet to be collected, there is now due the Association for annual fees only $455.

The following are statements of receipts and expenses for 1886–1887, and 10 months of 1888, viz.: July 1, 1888, to May 1, 1889:

STATEMENT FOR 1886.

Current expenses for the year		$5272 15
1886 assessments received	$5105 00	
1886 assessments not yet received, but considered good	20 00	
Membership fees	140 00	
		5265 00
Deficit		$7 15

STATEMENT FOR 1887.

Current expenses for the year		$5693 08
1887 assessments received	$5230 00	
1887 assessments not yet received	90 00	
		5320 00
Deficit		$373 08

STATEMENT FOR 1888.

Current expenses for 10 months, July 1, 1888 to May 1, 1889 . . .		$5718 33
1888 assessments received	$5365 63	
1888 assessments not yet received, but considered good	225 00	
		5590 63
Deficit		$127 70

Before closing this report, the Treasurer desires to thank the members of the Association for their uniform kindness, courtesy and promptness in assisting him in the duties of his office.

Prompt replies in correspondence and prompt remittances have done much towards bringing the very large number of accounts on our books into the very satisfactory condition in which the most of them are at the present time.

By action of the Council, approved by the Association (see Proceedings 1888, page 41), the Treasurer is authorized to make drafts on members whose dues are not paid promptly.

The Treasurer has made some drafts the present year, but it is to be hoped that members will not wait to be drawn on this coming year, as the collection of the drafts brings a charge upon the treasury of the Association.

Signed: S. A. D. SHEPPARD,
Treasurer.

Boston, May 1, 1889.

DETROIT, MICH., *May* 22, 1889.

The Examining Committee having carefully examined the Treasurer's books and vouchers, and compared them with this report, would respectfully report the same as correct.

WM. DUPONT, *Chairman Ex. Com.*
ARTHUR BASSETT,
JAMES VERNOR.

DETROIT, MICH., *May* 22, 1889.

To the Council, A. P. A.

GENTLEMEN: The Committee on Finance would respectfully report that the books of the Treasurer show the financial condition of the Association as follows:

Receipts from July 1, 1888, to May 1, 1889, nine thousand six hundred and ninety-one dollars and thirty cents ($9691.30), as follows:

From sale of 9 certificates @ $5		$45 00
" " 8 " 7 50		60 00
" " Proceedings		190 63
" the Ebert Fund		24 00
" Life Membership fees, viz.:—		
Louis Woltersdorff	$40 00	
Edward L. Milhau	20 00	
George J. Seabury	60 00	120 00
" Interest on deposit in bank		36 15
" Annual fees, 1884	$15 00	
" " 1885	60 00	
" " 1886	235 00	
" " 1887	490 00	

From Annual fees, 1888	$3220 00		
" " 1889	1050 00	5070 00	
" National Formulary		4145 52	$9691 30
Balance on hand, July 1, 1888			2376 07
			$12067 37

DISBURSEMENTS.

Amount paid out for acccount of National Formulary and expenses of the Association, as per report of Treasurer		9120 92
Balance on hand May 1st, 1889		$2946 45

The balances due by members for dues, and considered good, are as follows:

Dues for 1886	$20 00	
" " 1887	90 00	
" " 1888	225 00	
		335 00
Making total assets (outside of funds invested)		$3281 45

WM. DUPONT,
JAMES VERNOR.

Treasurer Sheppard being absent, on motion of J. M. Maisch and L. C. Hopp, Mr. Fred. Wilcox was appointed Treasurer *pro tempore*, and was authorized to procure the necessary blanks for receipts.

On motion of J. M. Maisch, Rule III. on Finance was for the present meeting suspended, in so far as to permit the Treasurer *pro tempore* to pay such bills as may be approved by Council.

J. M. Maisch read a letter from Mrs. A. V. Sumner, in regard to the terms for reporting stenographically the proceedings of the present meeting, and stated that the Committee on Publication had accepted the proposition. The action of the committee was approved.

A letter from Mrs. L. E. Markoe, accompanied by a note from G. B. F. Shedd, was, on motion, referred to a committee consisting of Jos. L. Lemberger, Henry Canning, Linus D. Drury, and the Treasurer of the Association.

In a written communication, S. A. D. Sheppard recommended that Chapter VIII. Article IV. of the By-Laws of the Association be amended by striking out in the first line the words *not in arrears to the Association*, so that the By-Laws shall read "any member who shall pay, etc."

On motion of J. M. Maisch this was referred to the Association with a negative recommendation.

Treasurer Sheppard desired instructions from the Council as to what course shall be pursued in the following and similar cases, viz:

Five members whose dues are paid up to July 1, 1888, have since that date sent in their resignations, but decline to pay the annual dues charged to each active member, July 1, '88, viz: For the year, July 1, '88 to July 1, '89. Shall their resignations be accepted, or shall their names be kept on the list, bills sent to them regularly as to other members, and if they do not pay, drop them at the end of three years?

On motion of J. M. Maisch, the Treasurer was directed to accept resignations from

members between July 1st and December 31st, following the year for which they have paid annual dues in full.

Treasurer Sheppard recommended that the Treasurer be instructed to send to the Permanent Secretary, for publication in the Proceedings, a statement of receipts and disbursements during May and June, 1889, the same to be printed in the Proceedings near the Treasurer's Report.

On motion of M. W. Alexander, the Treasurer was so instructed.

The following was read: Mr. George F. Dinsmore, a member, resident in Boston, is in arrears for 1885, 1886, 1887, 1888. He has written to me as follows:

"BOSTON, *January* 21, 1889.

"S. A. D. SHEPPARD, Treasurer, A. P. A.

"*Dear Sir:* It has been four years since I retired from the retail drug business, and I should have retired from the A. P. A. at the same time, and as I find that I owe dues for 1885, 1886, 1887, and 1888, and have now no use for the Proceedings, I should like to give the Association the volumes for 1879, 1880, 1881, 1882, 1883, and 1884, which I have, and five dollars in cash, to settle the matter, and have my resignation accepted, to date 1885. Very truly yours,

"GEO. F. DINSMORE."

I recommend that Mr. Dinsmore's proposition be accepted.

S. A. D. SHEPPARD, *Treasurer.*

Boston, May 10, 1889.

On motion of G. W. Kennedy, the proposition of Mr. Dinsmore was accepted.

Attention being directed to applications from various institutions for copies of the Proceedings, on motion of L. C. Hopp, seconded by J. M. Maisch, the Committee on Publication was authorized to furnish copies of the Proceedings at cost, including postage, to public libraries and other institutions.

Adjourned until 8:30 p. m.

NOTE BY THE PERMANENT SECRETARY.—In compliance with the instructions by Council, the following supplementary report of the Treasurer is here inserted:

REPORT OF TREASURER AMERICAN PHARMACEUTICAL ASSOCIATION, MAY 1, 1889, TO JULY 1, 1889.

RECEIPTS.

Cash on hand May 1, 1889		$2946 45
Received from Life Membership fees—		
Oliver W. Fuller	$40 00	
Enno Sander	20 00	
		60 00
Received from sale of Proceedings		27 65
" National Formulary		32 50
" Annual dues for 1885		10 00
" Annual dues for 1886		30 00
" Annual dues for 1887		40 00
" Annual dues for 1888		65 00
" Annual dues for 1889		1010 00
" Annual dues for 1890		5 00
" Interest on deposit in New England Trust Company		39 34
		$4265 94

DISBURSEMENTS.

Life Membership fund		$60 00
Check No. 128, Geo. W. Kennedy—		
Salary as Secretary of Council, 1888 to 1889	$50 00	
Salary as Secretary of Committee on Membership, 1888 to 1889	150 00	200 00
Check No. 129, Standard Publishing Co., printing and stationery		42 50
Check No. 130, Inquirer Printing and Publishing Co., National Formulary		81 60
Check No. 131, John M. Maisch, National Formulary		18 08
Check No. 132, John M. Maisch, sundry expenses		24 60
Check No. 133, Karl Simmon, Committee on Arrangements		30 25
Check No. 134, C. Lewis Diehl, salary 1888 to 1889		750 00
Total		$1207 03
Cash on hand July 1, 1889		3058 91
		$4265 94

Mr. Kennedy read the report of the Committee on Membership (see page 9). The reading of the report of the Committee on prize essays was deferred until the next session.

When the report of the Committee on the revision of the U. S. Pharmacopœia was called for, Mr. Ebert on behalf of the Committe requested that a specific time be fixed for the reading and discussion of the report, whereupon Mr. Painter moved that a special session be held for the consideration of the report on the revision of the Pharmacopœia, to convene immediately after the adjournment of the second session of the Section on Commercial Interests. The motion was duly seconded and adopted.

When the Committee to visit the American Medical Association was called upon to report, it was stated that, if deemed necessary, the Committee would probably report by telegraph from Newport, where the meeting of the American Medical Association was being held.

The following report was next read, and on motion, accepted and referred:

REPORT OF THE COMMITTEE TO VISIT THE NATIONAL WHOLESALE DRUG ASSOCIATION.

To the American Pharmaceutical Association.

GENTLEMEN :—The Committee who were appointed to visit the National Wholesale Drug Association attended to the duty assigned to them.

The meeting was held in Saratoga, N. Y., last September at the United States Hotel, and was largely attended; representatives from the wholesale trade, and manufacturers, etc., from all parts of the country being in attendance.

Your Committee were received with marked courtesy, many of the Drug Association testifying to the high regard and estimation that they had for the American Pharmaceutical Association.

Your Committee were impressed with the manner in which business was despatched by the Convention; order and system, coupled with quick decisions, being the rule,

tedious discussions not being encouraged. Cordial relations between the two Associations were desired, and your Committee respectfully recommend that such be fostered and extended by this Association.

Signed,

JOSEPH P. REMINGTON, Chairman,
GEORGE MERRELL,
CARL S. HALLBERG,
GEORGE J. SEABURY,
W. P. DEFOREST.

Regarding the Committee on National Formulary, the Permanent Secretary read the following from a letter by Mr. C. L. Diehl, Chairman of the Committee.

Respecting the work of this Committee, there has been nothing done, and so far as I can judge, nothing necessary since the Detroit meeting. I propose during the coming year to invite criticisms and communications from the members of the General Committee, and will be governed by the outcome.

With the view of appointing the Nominating Committee, the roll of States represented was called. A question being raised as to the exact meaning of the Section 7, Article XI, Chapter IX of the By-Laws, the chair made the following ruling:

THE PRESIDENT.—The sentence "shall call the roll of States represented, requesting each State in turn to appoint two members" means that the appointees shall be members of this Association, although our habit has been heretofore to allow persons delegated to, but not members of, this body to act upon that Committee. I think the reading is plain that there shall be two members, meaning members of this Association: I shall rule that way.

MR. HALLBERG.—How will that ruling affect those who are applicants for membership and have not yet been elected?

THE PRESIDENT.—They will be too late to act on the Nominating Committee.

MR. EBERT.—It seems a hardship at this time, that persons coming here as delegates should be ignored until they can be elected; while the application is in, we certainly should waive parliamentary usage in this particular instance, if we can.

THE PRESIDENT—I think that the Association itself should have the nomination of its officers, and that it is wrong to appoint delegates who are not members; or that a State should be permitted by this Association to legislate for a body in which its representatives have no interest, at least not sufficient interest to identify themselves with the Association. I think that this section is very clear that there shall be two members, meaning members of this Association.

MR. PAINTER—Under your ruling, I do not see why delegates who have not yet perfected their membership should not be appointed upon the Nominating Committee, provided they become members in the meantime by signing the roll and paying the dues, when they would be members and competent to act on the Nominating Committee.

THE PRESIDENT—There is no question of it.

On motion, duly seconded, a recess of five minutes was taken to enable

delegates desirous of becoming members to join the Association by signing the Constitution and paying the fee. On reassembling, the nominating Committee was completed as follows:

Arkansas.—W. L. Dewoody.
California.—W. M. Searby, John Calvert.
Connecticut.—F. Wilson, T. F. Main.
Florida —H. Robinson.
Illinois.—A. E. Ebert, C. S. Hallberg.
Indiana.—Leo Eliel, J. H. Andrews.
Iowa.—S. H. Moore, H. M. Griffin.
Kentucky.—E. L. Pieck, J. F. McKinney.
Maryland.—C. E. Dohme, J. Winters.
Massachusetts.—J. H. Manning, H. M. Whitney.
Michigan.—A. B. Stevens, A. Mann.
Minnesota.—C. Weschke.
Mississippi.—J. W. Eckford.
Missouri.—G. Eyssell, Wm. Youngs.
Nebraska.—N. A. Kuhn, C. F. Goodman.
New Jersey.—C. F. Dare, G. E. Mennen.
New York.—G. Ramsperger, P. W. Bedford.
Ohio.—C. B. Johnson, G. L. Hechler.
Pennsylvania.—J. M. McNeill, J. H. Stein.

In addition the President appointed the following five members, who are not delegates: J. Devine, of California; K. Simmon, of Minnesota; J. H. Redsecker, of Pennsylvania; John Ruppert, of Ohio, and R. C. Hattenhauer, of Illinois; and at the request of some of the committee members, announced that the committee would meet at 7:30 p. m. at Parlor D of the Palace Hotel.

The following appointment, by Vice-President Wilcox, of the Committee on the President's Address, was announced: K. Simmon, of Minnesota; T. F. Main, of New York; A. E. Ebert, of Illinois; W. M. Searby, of California, and H. M. Whitney, of Massachusetts.

On motion, the Association adjourned till Wednesday morning at 9 o'clock.

SECOND SESSION—TUESDAY MORNING, JUNE 25.

The meeting was called to order at 10 o'clock by President Alexander. The Permanent Secretary read the minutes of the first session, which were approved. The Secretary of the Council read the minutes of that body, which were approved. The minutes give the following information:

THIRD SESSION OF COUNCIL—PALACE HOTEL, JUNE 25TH, 8:30 A. M. (5 members present).

Vice-Chairman Painter presided. The recommendations of 75 candidates for memship were examined, and ordered to be presented to the Association for final action.

Adjourned, to meet at the call of the Chair.

Mr. Wilcox read the following report:

SAN FRANCISCO, *June* 24, 1889.

The Nominating Committee respectfully submit to the Association for election to the offices opposite their names the following gentlemen:

Emlen Painter.—*President.*
Karl Simmon.—*First Vice-President.*
W. M. Searby.—*Second Vice-President.*
J. W. Eckford.—*Third Vice-President.*
S. A. D. Sheppard.—*Treasurer.*
J. M. Maisch.—*Permanent Secretary.*
——————*Local Secretary.*
C. Lewis Diehl.—*Reporter on Progress of Pharmacy.*
Leo Eliel,
W. Scott Thompson, } *Members of the Council for three years.*
John H. Dawson,

F. WILCOX, *Secretary.*

On motion of Mr. Searby the report was accepted, and on motion of Mr. Calvert the Secretary was directed to cast an affirmative ballot for the nominees. The ballot was deposited and the President announced the nominees presented by the nominating committee, to have been duly elected to the respective offices for the ensuing year.

The names of the 75 candidates for membership, presented by the Council, were read by Mr. Kennedy, and on motion the persons named were elected.

The Secretary read a letter signed by numerous citizens of Salem, Oregon, inviting the members of this Association, while on their way to Portland, to visit the capital of Oregon and accept of the hospitalities of its citizens. The Secretary was ordered to acknowledge the letter with the thanks of the Association.*

The Secretary read the following communication from Mr. Heinitsh, who had not yet reached San Francisco:

COLORADO SPRINGS, *June* 19, 1889.

To the American Pharmaceutical Association.

I have pleasure in presenting Asbury Park, N. J., as the place of meeting of the American Pharmaceutical Association for 1890.

The advantages are that Mr. Bradley, the founder, has offered free the Educational Hall and Library Room, for the meeting and exhibit room. The Educational Hall has a seating capacity of 1000 or over, and the Library Room is 100x50 feet. The Park is in direct communication with New York and Philadelphia by numerous trains daily, The Coleman House has offered to be headquarters at reduced rates. and also their ball room, connected with the hotel, for the meetings, if desired.

Asbury Park is a popular sea-side resort, and is visited yearly by the best class of people, and its hotel accommodations are ample. It has a board walk along the ocean, 2½ miles long and from 25 to 80 feet in width. Mr. Stephen Wooley has written that the same offers made by Mr. Bradley to Mr. Thompson and myself, in 1887, are still binding. The season will be over at the time of our meeting, and reasonable terms can be made with all the hotels. Yours truly,

CHARLES A. HEINITSH.

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*The acknowledgment was sent after adjournment of the Association from the Hotel del Monte, near Monterey, Cal., when it was ascertained that the arrangements for the return trip by the several parties would probably exclude a sojourn at Salem.—PERMANENT SECRETARY.

On motion this communication, together with all similar ones which may be received, was referred to a committee of three to be appointed by the Chair, said committee to report during the present session. Messrs. Painter of New York, Ebert of Illinois, and Robinson of Florida were appointed the committee on the time and place of the next annual meeting.

An invitation from Messrs, Greenebaum & Co. to visit their wine vaults was read, accepted and ordered to be acknowledged.

The reading of reports being now in order, the Secretary stated that the report on the Progress of Pharmacy could not be finished at this time, since the By-Laws required it to give a synopsis of all pharmaceutical publications up to June 30th. From a letter of the Reporter the following was read:

LOUISVILLE, KY., *June 18th, 1889.*

It was my intention to have an introductory to my report ready for the meeting, but I find that I cannot get it ready in useful form. I purpose to let this year's introductory embrace a resumé of the editorial matter from the principal journals, together with such matter as cannot be well classified in the report; and to write out the introductory now would make it too one-sided.

Yours truly,

C. LEWIS DIEHL.

The Committee on National Formulary not being ready to render a report (see page 15), was on motion continued.

The reports of the Auditing Committee were read, together with the reports of the Chairman of Council, the Treasurer and the Committee on Publication, (see pages 17, 19, 7); all these reports were, on motion, accepted and referred for publication.

THE PRESIDENT.—Does the Treasurer report our liabilities? Have all salaries been paid?

THE SECRETARY.—Orders have been drawn for all bills presented, and I presume they were paid. All salaries have been paid, and I know of no other liabilities.

THE PRESIDENT.—Has the salary of the Reporter on the Progress of Pharmacy been paid?

THE SECRETARY.—That comes into the following year's account.

THE PRESIDENT.—That is just what we don't want.

THE SECRETARY.—I desire to state here, Mr. President, that when the office of Reporter on the Progress of Pharmacy was created in 1873, it was at that time decided that the salary be paid at the time when the report was handed in; and since the report cannot be finished until about September, the usual time of our meetings, the salary is paid subsequently—therefore it always appears in the succeeding year's account; it has been customary from the very beginning.

The following was read by the Secretary:

REPORT OF THE COMMITTEE ON PRIZE ESSAYS.

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Gentlemen: The Committee, after having examined carefully the papers presented at the Detroit meeting, unanimously recommend that the Ebert prize be awarded to Joseph F. Geisler, of New York, for his paper presented to the meeting on "Notes on the Morphiometric Assay of Opium."

JOSEPH P. REMINGTON,
JOHN CALVERT,
EMIL SCHEFFER.

On motion, the report was received and the recommmendation approved.

Mr. Painter stated that invitations for next year's meeting had been received from Asbury Park, N. J.; Jacksonville, Fla., and Old Point Comfort, Va., and requested an expression of the views of the members present.

MR. WHITNEY.—The desirability of meeting at Asbury Park has been several times urged upon me by the gentleman whose communication has been read. I know nothing about the place, but at his request I present his views. He is very decidedly in favor of Asbury Park. My own desire is that some time—perhaps not at present—this Association may meet in Portland, Maine, and take an excursion from there to Bar Harbor, which is the fashionable place of resort at present. The sail down from Portland would be simply magnificent. For the next meeting, however, I should much prefer Old Point Comfort to Jacksonville. I don't think the scare about the yellow fever in Jacksonville is quite over yet, and for many reasons it seems to me undesirable to go so far south at present. We have this year taken a long journey from the East, and it would be a long journey into Florida. I should much prefer Old Point Comfort. The sail down the Chesapeake Bay from Baltimore would be delightful, the sail from New York to Norfolk would be very pleasant, and the ride from Norfolk up is very short and quite charming. We should, if possible, select some place where there would be a little rest from our labors, a little comfort and ease; and I fear if you go to Jacksonville it would be hard work, and not as comfortable as Old Point Comfort.

MR. ROBINSON.—I hope I will be pardoned for making a few remarks, and wish first to explain that I will answer any questions that may be asked of me in regard to the locality I come from; and secondly, I want to state that we have a place for summer and winter resorts, with special railway fares from all over the United States to our place. Jacksonville has about thirty-five to forty thousand inhabitants. We have a sea beach fifteen miles from our town connected by rail, where it costs twenty-five cents to go and come, and the finest hotel in the civilized world. We have a beautiful climate, plenty of orange trees, no desert to pass through, but in getting there you pass through the best part of the United States, the air fragrant with flowers and limes, citrons and lemons; we take you where you can catch fish with the line or the pole; we take you where you can see the sun set in all its greatest splendor and glory; so bring along your wives and your sweethearts, and enjoy what we have to offer. While I appreciate California, which is a great and beautiful state, I think that you will find in Florida everything to afford you pleasure and comfort that can be found elsewhere. You will find whole-hearted southern people who will extend you every hospitality; you will find them clever, sociable and agreeable. Occupying a somewhat analogous position with the Chinese of California, you will find our negroes, the one undoubtedly bad, and the other industrious and careful and who never gets into the police court. You will find that

there is no vestige of yellow fever; everything about our houses is in excellent condition. We are all furnished with bran new bedding, every house, at the United States expense. I think they spent six hundred thousand dollars. So I don't know of any reason why you may not go. The rates of fare are a great deal lower than they would be to any point you may think of, and as to hospitality, I guarantee it will be second to no place in the United States.

Mr. Kennedy.—There are several reasons why this Association should meet in the South. We have had numerous invitations in years gone by to meet in one of the Southern States, and the farthest place South we have met in was Atlanta, Georgia. There is a disposition in the South among pharmacists to connect themselves with this Association, and they have taken a great deal of interest by joining the Association. This year we meet in June, next year we could meet in New Orleans or any far Southern city, it does not matter to me which, in May; then the following year let us go to Portland or somewhere in Maine, say in August. The time thus divided up should be taken into consideration; then in subsequent years we could meet at any place in the month of September.

I think if we do not go South next year, in two or three years we will be almost compelled to go South, and we will then have a long year and a short year. For the good of the Association and the people in the South the Association should go there. We should not consult our own personal interests and comfort in this matter; we are here for the benefit of the Association, and should go to a place where we could do the most good, regardless of comfort and other considerations. Many of us had a great deal of discomfort in coming here, but I felt convinced that the Association should prove to the people on the Pacific Coast that we had their interests at heart. For the good of the Association and for the good of the South, let it be in Florida or Louisiana, I don't care where—let us go far South, and then the following year let us go to Maine.

Mr. Redsecker.—I rise to ask that the consideration of the selection of a place be postponed until the next session, so that my friend who has been advocating Asbury Park could present his reasons and the attractions of Asbury Park before the final vote is taken on the place of meeting. He could not be here at an earlier session, for reasons that it is not necessary for me to give.

Mr. Dohme.—I think it would be very undesirable to select Jacksonville for our next meeting; the main reason is on account of the yellow fever. We are not through the summer yet, and we do not know whether all germs of yellow fever have been eradicated. I think it would cause many of our members to stay away. I have been in Jacksonville, and can endorse all that Mr. Robinson has said. It is a beautiful place, with delightful hotels and attractive surroundings—at the same time I think that would be a very great and serious drawback. Outside of that, it is a great distance to go for many of our members, and as this year we have traveled long distances and are travel-worn, I think the next time a more convenient place should be selected in order to enable all of our members to attend our meeting. I should like to invite the members to select Baltimore as the place of meeting. The Baltimore druggists would be delighted to have you meet there. At the same time I have not been instructed. Old Point Comfort is very near our city, and as has been stated, the trip down the Chesapeake Bay will enable all members to visit Baltimore, Washington, and other places of interest. The Blue Ridge Mountains are very near, and the members would have an opportunity to see a country which has not been visited by them, and would interest them very much. Old Point Comfort has one of the best hotels in the United States, elegantly conducted, fine vineyards, and is in a delightful country, especially if we take September for the time of meeting, and I think everything would be in favor of selecting Old Point Comfort.

MR HALLBERG.—We should look to the good of the Association, and not for any special or personal interest. As this is probably the most memorable meeting in the history of the Association as far as distances are concerned and long travel, next year I think will be the most memorable in the history of the Association for the chief purpose of the Association. The Pharmacopœia Revision Committee will then be in a position to offer us substantially the result of their preliminary labors, and I think if there is one thing more than another that this Association should be thoroughly interested in, it is in the revision of the Pharmacopœia. For that reason I think we should meet at as centrally located a place as possible, where we can have the very largest attendance, where persons, especially those connected with colleges, and others, could come without any particular expenditure of time, and that we should have the entire country if possible represented, for the main object in view, and where there are not any side scenes. We will have enough side scenes here before we get through to last us for five years. Next year we should draw out the largest possible attendance for the purpose which I have stated. Therefore, I should like to favor some place on the eastern sea-shore, either New York city or Baltimore, or some smaller place like Asbury Park or Ocean Beach; possibly Old Point Comfort may be centrally located enough.

MR. BEDFORD.—Mr. President, regarding the place of meeting I have had some correspondence, and from the answers received, I think that Old Point Comfort presents the greatest advantages for the Association, gathering together a very large number from all points. It is connected by means of Norfolk with every railroad in the United States, and it is always possible to get excursion rates from every locality to Old Point Comfort. Correspondence with the proprietors of the hotel assures us that the rates, which are usually four dollars a day, will be made at three dollars per day; and they have rooms for exhibits and for meetings. Now, those are the three essentials; ease of access, convenient rooms, and reasonable price. It is one of the best kept hotels. This year we have been in the extreme West, and next year we want to go South; but it is not advisable in my judgment to go to the extreme South, no matter whether Jacksonville, Atlanta, Nashville, or New Orleans, or what month you may select, but the month of September at Old Point Comfort is delightful for temperature. There is nothing around to be interesting to those who only go for pleasure, or not so much as to take away from the profit of our meetings. Therefore, I think that Old Point Comfort, or Fortress Monroe, whatever you choose to call it, is one of the most advantageous places for a successful meeting.

MR. ELIEL.—So far as I am concerned personally, I have no particular preference for any locality; but there are certain things that must be taken into consideration, which Mr. Hallberg has excellently stated. We must meet at some place reasonably central, so we may expect a good attendance; we must meet at a time which will be convenient for most of our members. This, Mr. President, is for the good of our Association. Next year the various State Associations will appoint delegates, and instruct them on matters concerning the revision of the United States Pharmacopœia, and these gentlemen must or should be with us. Most of the State Associations do not meet until the latter part of May or in June; but very few meet later than that, and nearly all before our usual meeting time. This year, Mr. President, that is entirely changed. Only about half of the State Associations have met up to now. They are not with us by delegates. One reason, perhaps, is because of the closeness of the State Associations' meetings to that of the American Pharmaceutical Association. Now, go where you will, but go where we can have a full and intelligent representation from the State Associations from all parts of the Union. We should go not earlier than the latter part of August.

THE SECRETARY.—I did not intend to say anything in regard to this question, but the

statement made by Mr. Eliel, I think, should not go on record without something being said about it. Mr. Eliel said we should always meet at about the usual time. For many years past there has been an impression among the pharmacists residing west of the Missouri that the Association had at some time or other resolved never to meet west of the Missouri. I don't know whether this was known to the individual members, but as Secretary, I have received letters from pharmacists residing on the Pacific coast, in Nevada. Colorado, and other points west of the Mississippi, and I had to write many letters in response, telling them that such was not the case. It is similar in regard to the South, The idea has gained ground, in some sections, that the Association does not intend to go south. The Association cannot go to any of the extreme Southern States in August or September, for various reasons which are known to every member; meetings in the South must be held either early or late in the year. One experiment had been made with Atlanta. The time had been fixed for September, but during that year the yellow fever broke out, not in the eastern sections of the South, but in the Mississippi valley, and it was found to be impossible to hold a meeting even at Atlanta at the appointed time; consequently it was postponed until the latter part of November, and it was a small meeting, but otherwise productive of much good. Now the point I desire to make is this: that it should not go on record that the Association will meet hereafter only at a certain season of the year, but it seems to me the Association should accommodate itself to the wants of the different sections of the country. If the Association concludes to go South, it ought to go to that section at a time when every one can go South. As regards Old Point Comfort, it is certainly a very conveniently located place for meeting, but it is not a southern point in the strict sense of the word. Pharmacists in the southern part of the United States will not regard it as such, and a meeting held there should not be credited to the large section of the southern States.

Mr. Eliel.—I have been misunderstood by the Secretary. I stated that for the next year—not for all time to come—we should by all means meet at a time not earlier than to make it convenient for the various State Associations to have their representatives present on account of the importance of the revision of the Pharmacopœia and the matters connected with that.

Mr. Dohme.—I think the Secretary is very decidedly mistaken, as regards Old Point Comfort not being a Southern point. It is a point where Southern people congregate in summer and in winter.

A Member.—When they go North.

Mr. Dohme.—It is a great Southern resort. Many people go from Baltimore to visit Point Comfort, and there are nine out of ten from other parts of the South. It is in Virginia, and I have always considered Virginia as very decidedly a Southern State. It is beautifully located, and while it is very warm there in summer, in September it is a very pleasant place to stop.

Mr. Whitney.—I desire to ask if the Secretary desires to state distinctly and clearly that a meeting in September will not meet the approval of the Southern members of the Association.

The Secretary.—Mr. President: At our meetings held in September in different parts of the country, we have had many Southern members with us from time to time, and they have traveled hundreds and even over a thousand miles in order to attend the meetings. Those Southern members who attend pretty regularly, will meet with us wherever we go, in case it suits their convenience. What I meant to say in regard to meetings in the South, was intended to refer to the locality. If the Association intends to go South it

cannot go there in September, for various reasons which can be easily explained. The proper time to go South would be either early in the year, not later than May, or very late in the year, say about November. I also intended to convey the idea that our members residing in the Southern States would not regard a meeting held at Old Point Comfort as having been held in the South proper. It was the case when the Association met in Richmond. We regarded it as going South, but the members from the extreme South said, "You have come just merely to the borders of the Southern States: if you want to go South, go farther South, to the neighborhood of the Gulf of Mexico."

MR. EBERT.—We have been talking about central points, and I would like to call your attention to two central points which are certainly very desirable for holding a meeting. One is St. Louis, and the other is a great railroad centre named Indianapolis: those two cities are so centrally located as to offer the greatest inducements.

Vice-president Wilcox occupied the chair temporarily.

THE PRESIDENT.—As far as St. Louis is concerned, while I have no instructions from our druggists to invite the Association to meet there, I will say this, that the door-string hangs out. The Association is always welcome to St. Louis, and we will treat her as well as she is treated anywhere in the world if you agree to come there. As I said before, I am not instructed about inviting this Association, but I will now, with the acceptance of my colleagues, invite the Association to St. Louis, there to hold the next annual meeting.

MR. ELIEL.—On behalf of Indianapolis, I desire to state that I have received no instructions at all, but if this Association would desire to go to a very quiet, healthy place, a good big country town filled up with first class hotels—there are hotels there which stand second to no place in the Union—a town where the outside attractions would be so few that the members coming to the meeting will all be only too glad to attend—gentlemen, Indianapolis is the place. I don't reside in Indianapolis myself, but pretty close by; however, on behalf of the druggists of Indianapolis, I desire to say that should you conclude to go there you will receive a royal welcome, and you will have everything in the way of comforts and conveniences that you can have anywhere.

MR. PAINTER.—I have not heard all this discussion, but I don't like the tendency of it now. We have been in the West long enough for a little while; we are hunting for a central point.

MR. EBERT.—Do you call Indianapolis west?

MR. PAINTER.—Well, it is west of New York. We have a town farther east, which is central for every part of the United States, and people who go to the centre go nearer there than than they do to Indianapolis. Old Point Comfort comes nearer that point. But New York City has the string of its latch outside always and at all times, and though a more recent resident of that great city than others here, I think I can speak for the city, although not instructed, that New York will welcome the pharmacists from everywhere and at any time. It is certainly sufficiently central. All the railroads in the country centre in Chicago, they say, but New York gets them afterward; they pass through and get into New York finally, so New York is a central point.

MR. HALLBERG.—If we want a representation of about a thousand druggists next year, there is only one point where we can have it, and that is in New York City. There is no question about that. Druggists all over this country travel to New York all the year round, and we can from the west get four of five hundred men to go to the meeting of

the American Pharmaceutical Association, if it is held in New York City about the first week in September.

MR. BEDFORD.—I have not a word to say against New York. We would be glad to see the meeting held there, and we could make our arrangements to harmonize with everything that may be desired; and yet I do not take any back seat for what I have said in regard to Old Point Comfort. I thought that the views were that we should preferably go South. I still think that it is perhaps as desirable to go South as it is to go anywhere, but I heartily endorse all that Mr. Painter has said, and while we are not instructed to say or do anything about New York, I am sure we will give you just as hearty a welcome, and do as much for the best interests of this Association as can be done anywhere.

THE PRESIDENT.—I agree with Mr. Hallberg and Mr. Painter, and I believe I agree with all of you, that New York would be a splendid place to get a meeting; yet I am opposed to going to New York or to any large city to hold a meeting of our Association. The reason is simply this: as merchants, we travel to New York every year. Now, then, when the meeting of the Association is held, nearly every one of us would be around among the stores buying goods, and not attending to the interests of the meeting. What we want is to go to some place where the attractions are not so great as at San Francisco. We want to go to a country place or seaside town, or some place where the interests of everything will be united in the Association, and where the members will stay with us, and then look for the entertainments afterward—for sea bathing, for little excursions on the river, and so forth. I think the large cities are not the places to get the attendance; while the members would go there as on excursions, any number would go to do business, but not to attend the sessions.

MR. PAINTER.—I think that is strong argument for Asbury Park. The ten thousand want to go to New York, anyhow. Holding the meeting at Asbury Park, they would attend the meeting, and, it being only a little way from New York, afterward attend to their business; the attractions there are for both purposes.

MR. MAIN.—I think we all agree with President Alexander in what he has said in regard to the desirability of meeting in a country place. I wish to bring the attention of the Association to a place which I do not think has ever been mentioned—that is, the White Mountain region. It was my fortune a few years ago to be invited to attend a meeting of the Teachers' Association of the United States, which was held in the heart of the White Mountains. They have there a pavilion which was erected for the express purpose of holding conventions of this kind. A trip there would certainly be a delightful one to all of us, and the meetings would be attended by all who went. I wish to present this to the Association as a very desirable place for meeting, if not next year, at some future period. I am sure that all those who went would enjoy the trip, and I think you would get a good meeting there. In regard to my friend Mr. Painter's remarks, I cannot think of a more undesirable place to meet than Asbury Park.

MR. BEDFORD.—A place such as Mr. Main has mentioned, or like Old Point Comfort, is very desirable. Those who know Asbury Park know that in the month of September you would want to get away from it, owing to the mosquitoes. To get the members together for business is the object that ought to present itself to every mind, and a place that would promote that end is desirable. Everything points to Old Point Comfort, on account of the delightful climate and everything connected with it, as making it just the point where we can harmonize the best interests of the Association, and where we can get as large an attendance as we can get at any point on the Atlantic coast.

The Committee then withdrew, and after a short time presented the following report:

REPORT OF COMMITTEE ON TIME AND PLACE OF NEXT MEETING.

Your Committee have the honor to respectfully report in favor of holding the annual meeting, 1890, in the city of New York.

Time of meeting, the first Monday in September.

EMLEN PAINTER,
ALBERT E. EBERT,
H. ROBINSON.

The report was accepted. The question being on the place of holding the next meeting, Mr. Whitney moved to amend by substituting Old Point Comfort for New York, which amendment was carried by a vote of 15 to 9. Pending the consideration of the time, Mr. Hopp moved, seconded by Mr. Painter, to amend by substituting the second Monday (8th day) for the first Monday of September. This was carried, and the report as amended was then adopted.

Mr. Ebert called attention to the fact that the Association has no member residing at Old Point Comfort, and that a Local Secretary would have to be selected from the members residing at some distance from the place of meeting. The matter was referred to the Nominating Committee.

MR. PAINTER.—I have been requested by a member of this Association, to bring before it as an Association, not as a Section, that the pharmacists in the navy are not considered sufficiently. It is really a detriment to the profession of pharmacy to have them in the navy without rank. This question has been before the Association before, I am aware, but it is assuming some shape now, and the gentlemen who have sent me this paper requested that I should bring it before the Association, with the request to memorialize Congress or take such action as they thought proper for bringing it before Congress. At present the apothecary in the navy has no rank, and is obliged to mess with cooks, with stewards, and with others detailed from the ranks; he cannot mess even with the boatswain, or with the gunner; he is without a warrant, as it is called, and is liable to be discharged at any moment by the surgeon or by a superior officer. An instance has been brought up recently where a pharmacist and apothecary in the navy was taken to Yokohoma on a cruise and there discharged for some petty offense; and his pay was stopped immediately, and he was not able to get home. Now, if he had held some rank that could not be done. A bill is offered here to make him have rank, though not so high a rank as he expects to get in future, but a rank sufficient that he may have a warrant, which would give him the rank similar to the boatswain, gunner, carpenter, and sail-maker. That is all that is asked, and it is very little. If we memorialize Congress, and show the present standing of the apothecary in the navy, this request may be granted. The object is to give him a foothold, and from that we hope to get him up to a standing, if not equal to an assistant surgeon, at least close on to it, which would bring him up very much higher in the scale.

The Secretary read the proposed bill, which is as follows:

PROPOSED LAW RELATING TO THE APOTHECARIES OF THE U. S. NAVY.

A Bill to authorize the President of the U. S. of America, by and with the advice and consent of the Senate, to grant to the Apothecaries of the U. S. Navy a Warrant.

Be it enacted by the Senate and House of Representatives of the U. S. of America in Congress assembled:

1st. That the Apothecaries of the Navy shall receive a warrant, with the pay and emoluments of the same.

2d. That the said Apothecaries of the Navy shall not be entitled to any of the benefits that may be conferred by this Act until they shall have passed a satisfactory examination in the following branches, viz.: Elementary Chemistry, Materia Medica, Pharmacy and Botany.

3d. That the Board of Examiners shall consist of three medical officers designated by the Secretary of the Navy.

4th. That each and every Apothecary of the Navy, who shall be serving in such capacity at the time of the passage of this Act, shall be granted an examination in the above-mentioned branches, and if found proficient, shall receive a warrant.

5th. Resolved that this Act shall take effect immediately.

Mr. Kennedy wished that the bill should be amended so as to include also hospital stewards of the army; but the Secretary stated that the two subjects could not be included in one bill. After some further comments on the proposed bill by Messrs. Hallberg, Ebert and Hopp,

Mr. Ebert moved that this bill for the improvement of the condition and of the rank of the apothecaries of the U. S. Navy be approved and referred to the Section on Legislation with full power to act.

The motion was unanimously carried, after which the Association adjourned.

Third Session.—Tuesday Afternoon, June 25th.

Vice-President Wilcox occupied the chair. The Association transacted no business, and adjourned, when the Section on Commercial Interests convened.

Fourth Session.—Tuesday Evening, June 25th.

President Alexander in the chair. The Secretary stated the only business to come up now to be the reading of the minutes, which, on motion of Mr. Main, was deferred. The Association then adjourned.

Special Session.—Tuesday Evening, June 25th.

After the adjournment of the second session of the Section on Commercial Interests, at 9.15 p. m., President Alexander called the Associa-

tion to order for the purpose of considering the report of the Committee on the Revision of the U. S. Pharmacopœia, which was read by Mr. Hopp, as follows:

SAN FRANCISCO, *June* 25, 1889.

To the Members of the American Pharmaceutical Association.

Gentlemen: Your Committee believe that the scope of a report to this Association should only comprise such questions as have a bearing upon the general character of the work of revision, leaving matters of detail to the reports of local medical and pharmaceutical bodies of the country. With this object in view, we respectfully submit the following for your deliberation at this time:

1. That it is the sense of this Association that in the next revision of the U. S. Ph., all preparations, at least those for internal use, which are usually prescribed and administered by measure, be ordered to be made by weight and measure, as in the former Pharmacopœias; but that the Committee of Revision shall be at liberty to use the system of parts by weight in all other cases, and that they may use any other system, so long as the measures or weights are commensurate with each other, and of such a character that the strength of the product, or of any given fraction thereof, can be readily ascertained without tedious calculations.

2. The Pharmacopœia should be relieved of all antiquated or little used material, such as a number of crude drugs, galenical preparations (simple and compound pills), etc., all of which could be safely turned over to the care of the pharamaceutical profession.

3. In view of the absolute necessity of recognizing such important medicinal chemicals as antipyrin, sulfonal, etc., this Association considers that the existence of a patent does not *in itself* constitute a bar against the reception of any medicinal agent in the U. S. Ph. But it is suggested that the revisers act with great care and circumspection, so that no patented substances except those of established worth and *irreplaceable* by other remedies, be recognized.

4. Regarding the tests of identity and purity given in the United States Pharmacopœia, it is the sense of this Association that they shall be made as complete and rigid as it is practical to make them, and as will be fair to the manufacturers, the dispensing pharmacists and the purchasing public. While freedom from *injurious* admixtures should be insisted upon, the absence of an insignificant percentage of inert and unavoidable contamination can often be insured only at a greatly increased cost. A judicious decision should be made in each case, and the coöperation of the manufacturers invited, so as to settle upon a basis which may be equitable to all.

5. This Association emphatically reiterates its declaration, made at its last annual meeting, that the Pharmacopœia shall and will be the sole official authority, for all remedial agents treated of therein; that the National Formulary shall be an authority only for such as are not covered by the Pharmacopœia, and that the authority of the National Formulary shall cease whenever the Pharmacopœia supersedes any of its processes or directions.

6. That alcoholic preparations representing 50 per cent. of the *drug* be adopted so far as *practical*, and replace *fluid extracts* and *tinctures*.

7. The Revisers of the Pharmacopœia of 1880 having adopted a formula for a preparation known as "Spiritus Juniperi compositus" to take the place of a well-known beverage, would it not be advisable to introduce a class of similar preparations, or delegate them to the National Formulary?

We ask you to carefully consider these suggestions, and place yourselves on record by voting yes or no.

ALBERT E. EBERT, *Chairman*,

LEWIS C. HOPP, *Sec'y Com. on Rev. of Phar., of A. P. A.*

The report was, on motion, accepted, and the recommendations taken up seriatim for consideration and action.

The first recommendation, referring to weights and measures, was again read, when Mr. Painter suggested that a paper by Mr. Bedford bearing on this subject be now read. No objection being raised, the paper was read.

ON PHARMACOPŒIAL WEIGHTS AND MEASURES.

QUERY 42.—What system of Weights and Measures should be adopted in the next Revision of the U. S. Pharmacopœia?

BY P. W. BEDFORD.

The writer has so often asserted his views on the above topic before local associations and in print, that he can scarcely bring any new arguments before this body. Learning, however, that the query yet remained unanswered, he briefly presents the following, more as a method of bringing the topic before this body in hopes of securing its commendation of the present method adopted in the U. S. Pharmacopœia. I am aware that there has been much criticism adverse to the plan, and that perhaps if it were submitted to a popular vote of either the physicians or the pharmacists of our land it would be defeated. It is not unlikely, too, if the same method for decision had been resorted to, that percolation would never have been the method adopted for extracting drugs; yet who of us that has any pride in pharmacy would not consider that this would have been a serious retrograde step? The very fact that the systems of weight vary from those of measure is one of the reasons that we should adhere to a method which cannot but be more exact than the use of any variety of weight now established, by usage or law, and the measurement of fluids by a system which is almost impossible in the ordinary handling to secure *exact* measurement in the same receptacle, not only by different persons, but even by the same person. On one occasion some three years ago the same liquid in the same measuring glass was given to a number of persons, and they were requested to measure eight fluid ounces. It was an alcohol of sp. gr. 0.840, and the correct weight of the quantity would be 3062.+ grains. Each was given three trials. The liquid was then weighed, and in some twenty trials not one was exact. The temperature of the fluid was 60° F., so that the error did not originate in this way. The measure was correct when placed on a standard level and filled from an accurate flask. The error arose then not from the measure, or from the temperature, but partly from the method of holding the measure, and partly the difficulty of measuring liquids where the surface has a broad expanse, as in most of the measuring glasses made for dispensing uses.

This is only one of the minor errors that may occur. These faults are exaggerated by careless handling and inaccurate measures, which are

more frequent than weights, though these latter are found abundantly of less accuracy than they should be. The trouble is that not enough trial has been given to the plan by those who are most ready to condemn it, and they are unwilling to give the time or procure the small amount of apparatus that may be needed to make it a success in their own experience. On the other hand, it cannot but be regarded as the *best method* by all who have persevered a brief time until they have gotten the "hang" of it. The writer has on previous occasions given examples of methods of calculation for quantities that may suit the varying wants of pharmacists, from the men of moderate business to the large manufacturer. But in this assemblage it would seem to need no such elaboration, nor even that it should necessitate a word of defence. It was a great step in advance, and has met with the approval of the best men of our profession everywhere, as an easy solution of the problem of the several systems of weight, which, if we look over the world, are almost as numerous as the variety of languages that arose after the construction of the tower of Babel was attempted. To be sure we are only preparing our Pharmacopœia for our own land, and not for the world; but in the system of "parts by weight" there is a perfectness of method which precludes any necessity for errors.

Perhaps if in the next Pharmacopœia there be some fuller explanation of the plan, by giving in the preface a number of illustrative formulæ, it may better commend itself to the present opponents of the system. It is self evident that the prime object of such a work is to secure uniformity; and if the method adapted to that end is not complicated, and in the judgment of the members of the pharmacopœial convention "parts by weight" is the best plan, it should be continued.

The physician is not specially interested in this part of the volume, and the pharmacist is. The physician has no need to compound, he has only the finished product to deal with. It is said he opposes it because in fluids he does not know the exact quantity that may be present in a liquid, because the specific gravity of the various fluids is a disturbing element in the methods of calculation. This may readily be overcome by appending to some of the formulas the specific quantity of the leading active remedial in a definite measured quantity of the finished product; or a table of liquid products might be appended covering this ground.

The main object to be gained is uniformity of product, and it is safe to say that of all who have ever *tried* the method of "parts by weight" with unprejudiced minds, nearly every one is convinced of its *greater accuracy in results;* and this being the main object of such a text book, it should have the preference by a hearty approval of this organization, and its continuance at the next decennial convention for the revision of the United States Pharmacopœia.

MR. BEDFORD.—The resolution offered in the report would seem to require some explanation as to just what it means; it seems to me very ambiguous.

MR. PAINTER.—By what system of weights and measures is that supposed to be done—by the metric system or by the system usually adopted? The weights and measures of both systems have not the same relation; that is, a fluid ounce is not in the same proportion to a dry ounce that a gram is to a cubic centimeter.

MR. MAISCH.—The question asked by Mr. Painter, it seems to me, might be very well left for solution to the Pharmacopœial Committee.

MR. HALLBERG.—Aside from not specifying what particular weight or measure is to be employed—which I think the Chairman of the Committee has left open purposely, to be decided hereafter—the recommendation is directly in line with the form upon which the National Formulary was constructed. The Chairman makes a distinction in different classes of preparations. The first class, tinctures, syrups, and all liquid galenical preparations for internal use that are given by measure, by the teaspoonful or tablespoonful, should be made solids by weight and liquids by measure. Whether the metric system should be used, or whether we should have the decimal ratio or not, we could not decide now; that might be well left for the Committee of Revision, and I don't think it makes much difference. Then there is a second class—the liquid preparations that are used externally, like liniments, oleates and solutions; they might just as well be made parts by weight throughout for obtaining the percentage proportion, as was done in the National Formulary; so instead of having an oleate five or ten grains to the ounce, we could say it is five per cent. or ten per cent., which is much more definite in expressing its strength, especially if there are different strengths used. These are the two classes. I think that is the direction in which this proposition tends—that we should make a distinction between the liquid preparations that are taken internally and are administered by measure, and those that are used externally, and for which it is very convenient to express the strength in percentage. Upon these grounds I am heartily in favor of the resolution as proposed. There is probably no man in the country that has gone over this question as carefully, that has known the difficulties, and, at the same time, was as great an enthusiast for the doctrine of parts by weight system, as the gentleman who conducted our National Formulary. Now, after ten years' trial nearly, he has shown us that that is a proper compromise to make.

MR. STEVENS.—I must acknowledge that there is an inconvenience and some misunderstanding among physicians and those who administer medicines, in giving medicines by measure that are made by weight, and perhaps there might be some liability to error, but no more so than would arise from the use of the different measures in use. Physicians prescribe a teaspoonful. What is a teaspoonful, ordinarily? Are all teaspoons of the same size? Yet physicians do not hesitate to prescribe by the teaspoonful and by the tablespoonful, and if you will take the measures of these, you will find great variations in the doses administered. We will find if we make experiments by weight and by measure, that we can make better results by weight. An experiment was made three years ago, and it was found that there was a great variation in the preparations made by measure over those made by weight.

Now, is it not just as difficult to manufacture a liquid by weight, such as oleates, as Mr. Hallberg has spoken of, as it is to manufacture a syrup or some of those preparations which are taken internally? I would recommend the use of weights and measures in the manufacture of all preparations requiring percolation. The objection that has arisen to the use of parts by weight is not from the fact alone of administering those medicines by measure which were made by weight, but rather the objection which some have made of using parts by weight, because it was inconvenient. Now, if any one will manufacture by weight for three months, I guarantee that they will not see that it is in-

convenient any longer. They will find it just as easy to manufacture preparations by weight as it is by measure; and the great objection that has been made and the votes that have been taken in the different Associations are unjust, for such parties have never tried manufacturing by weight. Now, if you will take a vote and let only those vote who have made a fair trial by weight, I will abide by the decision.

MR. EBERT.—We hope that the National Pharmacopœia will become again national, and be used by the druggists of this country. It seems that this accuracy that a few of us are striving at simply defeats the object of the National Pharmacopœia. My own experience, after examining for the last four years the applicants who have come up before the State Board of Illinois, is that we are really losing the operations that are necessary for the instruction in pharmacy. The druggists of the country are simply now following the system of buying and selling, and not manufacturing. It is well enough for professors who are working very accurately in their laboratories to say that that is the accurate and proper way. We all agree to that. But when a quart of tincture or of any other preparation is to be made, and we ask the pharmacists of this country to make it by weight, they will not do it—they will either make it by measure, by following a formula which is given in some text-book or some commentary on the Pharmacopœia, or they will buy their preparations. Now, is that what we desire to come to? We have two or three thousand manufacturing pharmacists who are making the preparations for us. What we want is that the pharmacist shall make all preparations just as accurately as the physician who needs them, who prescribes by the teaspoonful and tablespoonful. As Prof. Stevens said a moment ago, there are not two tablespoonfuls alike. Now, when you make such little errors as we are likely to make by using measures--Prof. Bedford says that three persons who measured the same liquid did not agree—and since the tablespoonfuls that the physician orders do not agree, the errors will counteract each other.

We want to remain pharmacists; we want to make our own preparations; we don't want to drive the manufacture of our preparations into the hands of the manufacturing chemists or manufacturing pharmacists. We have been becoming nothing but the buyers and sellers of the remedies we are dispensing. Don't let us be sticklers for extreme accuracy, for in the matter of dosing that amounts to little. The physician who writes for a drachm of a tincture does a great deal of guess-work when he prescribes it. To come back again to accuracy. How do we know that a pound of aconite root is absolutely up to the standard? While we are handling these drugs, it is not in the power of a pharmacist living, in the usual routine of his business, to determine accurately the medicinal quality of that drug. Therefore, gentlemen, let us be rational. We have been going a step too far. We have tried to acquire such accuracy as is not practical in pharmacy. It is practical in the laboratory, but not in the store of the pharmacist. Don't let us put the rope around our neck any farther than we have it now, by compelling the pharmacists of this country to purchase their medical preparations, which they are doing to day to a certain extent. I am not speaking alone of the section where I come from. I know that the young men who come from other States to the State of Illinois to be examined, when the Examining Board ask them: "How do you make your preparations?" they answer, "We use fluid extracts in making our tinctures." I tell you gentlemen, it is true. I have gained more experience in that direction, since I have been on the Board for the last four years, than I have ever had before. I was a stickler, just as much as any of you gentlemen, but I have learned that in the progress of pharmacy we have gone a little too fast. Before making one an accurate man, you must reorganize the whole system of apprenticeship in this country; you have got to make scientific men of them. Twenty years ago, when I went abroad and met our brethren in Great Britain, I

scoffed at them for adhering to that old process of maceration. When I was in the store of Henry Deane, who was an honorary member of this Association, I noticed around the tops of his shelves in the back room, a lot of stoneware, and I asked him what those were for. He said, "We use those jars for making our preparations in." I said, "What, do you make the tinctures in them?" He said, "Yes;" I said to him, "You are away behind time; why, we make everything by percolation in our country;" "Yes," he said, "we tried that process, but we have come back to the maceration: we find that gives better results;" I thought to myself, "Oh, what old fogies you are; you ought to come to the United States, and see how we do things there." Since that time I have done percolation by the hundreds of tons, and I want to say to you to-day as a pharmacist that I am willing to go back to maceration, and will make better preparations than nine-tenths of the men who percolate. Yes sir, I want to say that that old system is better to-day than your new-fangled ideas for percolation put into the hands of inexperienced men. We have gone a little too fast, gentlemen, and it is well to call a halt, because you are driving your business out of your store; you are taking it out of your own hands, and putting it into the hands of somebody else.

THE PRESIDENT.—I would like to ask Mr. Ebert just this question: Do you believe that you can make a better preparation by maceration than by percolation, if you understand the manipulation?

MR. EBERT.—I mean that the old style of maceration, followed by displacing with the proper menstruum up to a certain point, or by expressing the material, will make a better preparation than by getting these fine powders and carrying on the process of percolation. I dont mean to say in one trial, but I say in repeated trials.

MR. STEVENS.—I suggested that we make the preparations that require percolation, up to a certain given volume, but I don't agree with him that we are driving them out now any more than years ago. When the last Pharmacopœia was issued, I know pharmacists who made their tinctures from fluid extracts, and they have done it since, and I don't believe that they do so more to-day that they did then.

MR. PAINTEE.—I don't like the assertion that the pharmacist is not accurate. The pharmacist is the one that studies accuracy, if anybody does, just as much as the manufacturer. Because the prescriber of medicine is not careful with his dosing, so much more reason that we should be accurate and exact up to the time that the prescriber gets hold of the preparation, because the differences cannot equalize after that. If it is inaccurate up to the time that the prescriber gets it, and then he is inaccurate in his dosing, because of using teaspoons or tablespoons that vary, that increases the inaccuracy instead of equalizing. I think that we should be as accurate as possible up to the time that the prescriber gets our preparations.

MR. HALLBERG.—I am really surprised to have to travel across this country and find professors in colleges in pharmacy talk about the only way that we can obtain accuracy is by weight, when as a matter of fact both our systems are based upon measure. From the cubic inch of water derived from the swing of the pendulum in the Tower of London, I believe, just as from the cube of the centimeter filled with water which constitutes the gram, do we derive our weights; a certain cubic measure of water is the starting-point. This being the case, why in the world then should we say that we can only obtain accuracy by weight, when as a matter of fact we have got to start by measure first?

MR. MAIN.—I think we are all of us interested, or should be interested, in making a Pharmacopœia for the pharmacists of this country, and therefore we should adopt a sys-

tem which it is more likely that the largest number of pharmacists will use. Years ago, when I was traveling, I used to find that there probably was not more than one Pharmacopœia in about ten stores; they used to use various Dispensatories for their formulas, which of course took the place of the Pharmacopœias; but I think our endeavor should be to make the Pharmacopœia the hand-book of every pharmacist in this country, by adopting that system which the largest number would use. I think that should govern our actions in this matter.

MR. REDSECKER.—I should like to know what is the difference between taking the United States Pharmacopœia, and using a Dispensatory that has exactly the same formulas as the United States Pharmacopœia has?

MR. HALLBERG.—The formula in the Dispensatory is not the same, and is not correct.

MR. REDSECKER.—The Pharmacopœia and the Dispensatory each give so many parts of the drugs.

MR. SEARBY.—Or so many ounces.

MR. REDSECKER.—Yes sir, or so many ounces. Suppose you take the parts by weight, that is the same as in the Pharmacopœia.

MR. HALLBERG.—If you take the equivalent, it is simply an approximation.

MR. SEARBY.—While this discussion has been going on, I have just been thinking how my clerk does. When I tell him to make four pounds or thereabouts of some fluid extract, I find that he sometimes uses the metric weights and sometimes some other—it is a matter of no moment; but when it comes to the finished fluid extract or the finished tincture, he takes in almost every instance a graduated bottle. That graduated bottle stands perpendicular as near as may be. There is not the liability to error that has been referred to by his not seeing it correctly, because it stands on the shelf, and it has the marks, some in metric and some in the other weights. He starts out to make say five thousand grams; he has it marked, and when the percolation reaches that point he stops. I believe that some such system as that is adopted, because I have seen it with quite a number of young men graduates of pharmacy, too: they resort to some such measure when it comes to working it out, because it is so much less trouble than weighing the product.

MR. HALLBERG.—Is the bottle standing on a scale or balance?

MR. SEARBY.—No sir.

MR. HALLBERG.—How can he tell when he gets five thousand grams it it?

MR. SEARBY.—He takes it by measurement; he takes cubic centimetres instead of grams by weight.

MR. HALLBERG.—He does not measure parts by weight at all?

MR. SEARBY.—It depends on how he starts out. In some instances, if he starts out to make a fluid extract, he will produce the same number of minims as he has grains; but sometimes he follows the Pharmacopœia approximately.

MR. HALLBERG.—The fluid extracts now have solids by weight and liquids by measure—the fluid extracts were excepted; it is only the tinctures to which the parts by weight apply.

MR. SEARBY.—We want to have the Pharmacopœia so constructed that a practical and easily workable formula will be in strict accordance with the Pharmacopœia. If we insist upon absolute accuracy conformed to the metric weights, we almost drive the business out of the hands of the small pharmacists.

MR. HOPP.—If I understood Mr. Bedford's paper right, he said that the three different times the measured preparations were inaccurate. I would like to ask him if these same gentlemen had weighed those preparations, would there not be a liability to error in weighing as much as there is in measuring?

MR. BEDFORD.—No, there is not.

MR. HALLBERG.—The objection to measuring is the variation in the measures. Now how was that measure determined; by weight?

MR. BEDFORD.—By weight.

MR. HALLBERG.—Was the weight correct?

MR. BEDFORD.—The weight was correct; the same weight was used in all.

MR. EBERT.—I have in my employ at present two graduates of pharmacy. They are from two different colleges of high standing. I have asked them from time to time to put a graduate on the scale and weigh the liquid into it. Not one of those graduates in pharmacy, with long experience, knew absolutely how to weigh. I doubt whether some men know how, although they may be professors—I have seen professors who didn't know how. They take a bottle and pour in, down the pan goes; they pour off a little, down it goes again. Now, if his training during apprenticeship was proper, he would pour in, resting his finger on the scale pan, and finding that gradually going down, he could stop, and thus he might get it more accurate. But I say, gentlemen, that you will measure more accurately than you will weigh, unless you have been trained to do it. I am now willing to go back, as my dear friend, Henry Deane, suggested, and not go quite so fast, to let others catch up. Let us keep our money or make money by making our own preparations. Let us induce the pharmacists in this country to manufacture the galenical preparations of the Pharmacopœia by giving them practical formulas for it.

MR. STEVENS.—I made experiments a few years ago with a number of students who had no practical experience at all. They were to make a certain preparation—two samples of it, one by weight and another by measure, and so on, till I had some forty samples of the same preparation, made by different students. I examined them, and found that they were much more accurate made by weight; but at the same time I think it would be better to make those preparations which are made by percolation, to make those to a given volume. If you will simply draw the line at that point, it would be convenient for everybody.

MR. HALLBERG.—I believe Mr. Stevens' experiments were made with acids. The Pharmacopæia has not recognized making acids by measure. Acids cannot be measured very well; sulphuric acid certainly not, it is too dense. Acids certainly should be weighed, and I don't think the examples were good illustrations in this case. Now, I should like once for all to say that I am tired of hearing this charge made, that if only the people that were opposed to this parts-by-weight system would try it once for three months they would never use anything else. I will say for myself when the preliminary draft came out in 1879 for the last Pharmacopœia, I then was in a position where I could try this parts by-weight system very thoroughly and on a great scale. I tried it

for two years repeatedly daily, because I saw that it was going to be introduced in the next Pharmacopæia, and after the expiration of those two years I concluded that the parts-by weight system was the proper thing for solutions—solutions of chloride of iron, chloride of zinc, or diluted acids, preparations of that kind; but for galenical preparations, tinctures, syrups, etc., it was not the proper system, because of a variation in volume; and that variation in volume was so great that when it was presented as a final issue to the Committee on Fluid Extracts, they recognized there was a variation of about forty per cent. of the volume of fluid extract of rhubarb and fluid extract of ginger, and they concluded that it was utterly impracticable to make the fluid extracts parts by weight, and adopted solid by weight and liquids by volume of the metric system. The Committee intended to issue an appendix giving the variations between volume and weight of the galenical preparations, but they were not able to do it when the Pharmacopœia was published in 1882; they have not been able to do it since; they cannot do it.

The question was then taken on the first recommendation of the Committee, and it was adopted.

The second recommendation, referring to antiquated drugs and preparations, was read, and on motion adopted.

The third recommendation, relating to certain medicinal chemicals, was read.

MR. EBERT.—Since we are not conversant with the secrets of the manufacturers of chemicals, we would have to ignore nearly half of the present definite chemicals in the Pharmacœpia if we desired to admit none which are made by secret processes. The preparations alluded to are definite chemical compounds, of which as a rule, the processes have been patented. It would not be proper, likely, for the Committee on Revision to introduce into the Pharmacopœia the word antipyrin. They must give its chemical formula—give its chemical name, its proper name—and leave to time a means of discovering some other process than the process that its manufacturer has and has patented for others to manufacture with.

MR. REDSECKER.—The process is not patented, I presume; but the name is, is it not?

MR. EBERT.—Both the name and process. The name is a trade mark, so to say, in some of them.

MR. REDSECKER.—Is it not manufactured in France under the name of analgesine?

THE SECRETARY.—Yes, sir.

MR. EBERT.—But the process is patented.

THE SECRETARY.—In Germany, not in France.

MR. EBERT.—Because in France they don't recognize the patent, but we do in this country. The Committee don't recommend at all the introduction of patented articles into the Pharmacopœia; but we should consider whether to put such chemicals into the Formulary or into the Pharmacopœia. We have to meet the question.

MR. REDSECKER.—Sulfonal is not a patented article, is it?

MR. EBERT.—It is a patented process.

MR. HALLBERG.—I have an amendment to offer, that the following be added to the Committee's recommendation: and that such compounds be recognized by descriptive chemical names, and not by therapeutic names.

MR. SEARBY.—Will Mr. Hallberg add that they be accompanied by distinguishshing tests?

MR. HALLBERG.—That is understood. Now, if I may be permitted, I will call attention to an illustration: Commercial salicylic acid is made by Kolbe's patent, which expired this year. If that had not been incorporated in the Pharmacopœia it would have been a very serious thing. We would have been without official tests for a preparation that is very largely used. Some of these preparations might become equally valuable, like sulfonal and others. I think when their therapeutic value is established, they ought to be incorporated in the Pharmacopœia. While I don't believe that the Pharmacopœia should lead in the roads of fashion, I think it ought to gather or hoard up for use that which has been demonstrated to be thoroughly and permanently valuable to the pharmaceutical and medical professions. But such chemicals should not be recognized in the Pharmacopœia by any therapeutic terms; for instance, antipyrin should not be recognized as antipyrin; for in a few years from now, should it survive, it may be used for very different purposes from what it is now. In justice to pharmacy, as well as medicine and chemistry, we should not commence again to introduce the old terms that we have discarded of late years.

So I would suggest that if these preparations be introduced at all, they be recognized by descriptive chemical titles.

MR. MAISCH.—I second the motion: and merely wish to add to what Mr. Hallberg has said, that the full descriptive chemical names might perhaps be very lengthy ones—chemists are in the habit of stringing them out—but in most cases they can be condensed conveniently, so as to be intelligible to physicians as well as pharmacists. It is the only way by which we can get over the difficulty for the present time and for the future. You must remember that a large number of chemists are at work in the line of synthesis. Originally this research was started mainly perhaps for the purpose of discovering a process for the manufacture of artificial quinine. If such a process had been discovered twenty years ago, perhaps the discoveror would have made a fortune in a very short time; but at the present time quinine is so very cheap that even if the process hereafter should be discovered and quinine manufactured artificially, it would not probably amount to a great deal in a pecuniary way. But these very researches have led to the discovery of a large number of chemicals which in the meantime have been found to possess a certain amount of value as remedial agents, and we certainly must expect that these investigations will be continued in the future, and probably a large number of such more or less valuable compounds may be discovered. It is very natural that the discoverer should secure for himself as a reward for his researches the process at least by which it was discovered, and consequently he may take out a patent. That leaves every man free, however, to manufacture the same preparation by any other process, if he can find one. It seems to me that the amendment offered by Mr. Hallberg covers the case very fully, and is in accord with the recommendation of the Committee.

The question being taken on the amendment, it was adopted, and the recommendation as amended was then concurred in.

The fourth recommendation, referring to tests of identity and purity, was read and on motion adopted.

The fifth recommendation, relating to the authority of the National Formulary, was read, briefly explained, and adopted without alteration.

The sixth recommendation, in regard to liquid preparations of 50 per cent. strength, was read and adopted.

The seventh clause, relating to admission into the Pharmacopœia of a class of compound spirits, was negatived.

On motion of Mr. Hallberg, the vote by which the sixth recommendation had been adopted was reconsidered.

MR. PAINTER.—Mr. President: While it would be very desirable to have such a class of preparations, it would not be desirable at the present time to throw out the fluid extracts. This must be accomplished more gradually. It would throw too many of the pharmacists' preparations into the hands of the manufacturers.

MR. MAISCH.—The recommendation of the Committee is not that fluid extracts and tinctures shall at once be thrown overboard, and fifty per cent. liquid preparations adopted in their place; but the idea is, as I understand it, that fifty per cent. liquid preparations shall be introduced with a view of gradually replacing the fluid extracts and the tinctures.

MR. PAINTER.—That would make another class of preparations. We have tincture of veratrum viride fifty per cent. Aconite which is forty per cent. can just as well be made of fifty per cent. strength, it is a very strong preparation anyhow. Several of the fluid extracts, like gelsemium and other very poisonous ones, could very well be made of fifty per cent. strength as an experiment; these would be strong enough for any purpose, and we could start the way.

MR. SEARBY.—I have always been in favor of such a class of preparations. The difficulty has been in regard to the name, so as to prevent, if possible, any confusion between two classes. The terms which have been suggested are so similar that I fear there would be a great deal of confusion. If such a measure is to be adopted, a name must be chosen that is entirely distinct and totally dissimilar from either of the others.

THE CHAIRMAN.—The question is not upon the name; the question before the house is upon the adoption of the resolution.

MR. SEARBY.—I was about to suggest that the matter should be considered whether the class of tinctures might not be abolished altoegther. Most of them contain altogether too much alcohol.

The sixth recommendation was then, on motion, concurred in; and the report of the Committee, as amended, was adopted.

MR. EBERT.—The Committee has brought before you only such questions as seem to be of general importance, and you may have been disappointed in not being called upon to vote or give your opinion on details. But the Committee thought it would be much more desirable to let the local Associations do that work, and for the present to confine the action of this Association to questions of a general character.

On motion, duly seconded, the meeting adjourned.

FIFTH SESSION.—WEDNESDAY MORNING, JUNE 26TH.

President Alexander in the chair. The minutes of the second, third, fourth and special sessions were read by the Permanent Secretary, and, on motion, were approved.

Mr. Kennedy read the minutes of the Council, which were approved:

FOURTH SESSION OF THE COUNCIL, ODD FELLOWS' HALL, JUNE 26TH, 3:30 P. M.
(5 members present.)

Vice-President Painter in the chair.

Five propositions for membership were examined and referred to the Association.

Bills from Adelina V. Sumner and Leo Eliel were audited and ordered to be paid.

The Permanent Secretary stated that Mrs. Sumner being prevented from acting as stenographer, Mr. Stephen Potter was reporting the proceedings, under the terms originally agreed upon.

The five candidates proposed for membership were elected, and the Association adjourned.

SIXTH SESSION.—WEDNESDAY AFTERNOON, JUNE 26TH.

The Association did not transact any business preceding the second session of the Section on Scientific Papers.

SEVENTH SESSION.—THURSDAY MORNING, JUNE 27TH.

EIGHTH SESSION.—THURSDAY AFTERNOON, JUNE 27TH.

No business was transacted by the Association preceding the sessions of the Section on Scientific Papers (third), and of the Section on Pharmaceutical Education.

NINTH SESSION.—FRIDAY MORNING, JUNE 28TH.

Immediately after the adjournment of the adjourned session of the Section on Commercial Interests, at 9:40 a. m., President Alexander called the meeting to order. The Permanent Secretary read the minutes of the four preceding sessions, which were approved.

The Secretary of the Council read the minutes of that body, which, on motion, were approved. These minutes give the following information:

FIRST SESSION OF THE NEW COUNCIL. ODD FELLOWS' HALL, JUNE 28TH, 8:30 A. M.
(9 members present.)

L. C. Hopp was elected Chairman *pro tempore*, and G. W. Kennedy Secretary *pro tempore*.

The election of officers resulted as follows: *Chairman*, J. M. Good, of St. Louis, Mo; Vice-President, Wm. S. Thompson, of Washington, D. C.; Secretary, G. W. Kennedy, of Pottsville, Pa.

The Standing Committees of the Council were constituted as follows:

Committee on Publication.—C. L. Diehl, *Chairman*, L. C. Hopp, W. M. Searby, J. H. Redsecker and J. M. Maisch.

Committee on Finance.—Wm. Dupont, *Chairman*, Leo Eliel and W. S. Thompson.

Committee on Membership.—Karl Simmon, *Chairman*, J. W. Dawson, C. L. Keppler, J. W. Eckford, Henry Canning; also *ex-officio* the Permanent Secretary and Treasurer. This Committee elected Geo. W. Kennedy its Secretary.

The Committee on the Centennial Fund consists of the President, the Chairman of the Finance Committee, and the Permanent Secretary.

The propositions for membership of five candidates were examined and referred to the Association for action.

The list of members in arrears, as furnished by the Treasurer, was considered, and those reported three years or more in arrears with their dues were ordered to be dropped from the roll, in accordance with Chap. VIII., Art. III. of the By-laws.

The five propositions for membership were then read, and the candidates, on motion, were duly elected.

The Committee on the President's address presented the following report, which was read by Mr. Whitney:

REPORT ON PRESIDENT'S ADDRESS.

SAN FRANCISCO, *June* 25, 1889.

Your Committee to whom has been referred the address of the President, respectfully report:

1st. That they note with regret the fact that the expenses of the Association for the past two years have exceeded our income from dues between $1,200 and $1,300. We recommend that rigid economy be practiced in regard to all expenditures, and we urge upon the Council and the Association the necessity of reducing our appropriations so that our expenses may be kept within our current income, until such time as our indebtedness shall have been paid, and a surplus of at least $2,000 accumulated.

2d. We think the suggestion of the President in regard to the adoption of the Metric System in the next Pharmacopœia may be safely left to the Committee of Revision of the Pharmacopœia.

3d. We make no recommendations in regard to Pharmacy Laws and interchange of State Certificates, as the special Committee upon State Pharmacy Laws will report upon this subject.

4th. We agree with the recommendation of the President in regard to the advisability of devoting a page in the volume of our published Proceedings, upon which to print a history of the origin, money value and use to which the proceeds may be applied of the "Ebert," the "Centennial" and "Life Membership" funds, and we therefore offer the following resolutions:

1. *Resolved*, That the Council be directed to practice rigid economy in regard to expenditures and appropriations, until our indebtedness is paid and we have accumulated a surplus of at least $2,000.

2. *Resolved*, That a committee be appointed by the Association or Council who shall confer with the Treasurer, and devise some plan by which the current expenses of the Association shall not exceed the income from annual dues and fees, and rigid economy is urged until a surplus of at least $2,000 shall have been accumulated from this source.

3. *Resolved*, That the Secretary be directed to devote a page in each volume of our published Proceedings to the "Ebert," the "Centennial" and the "Life Membership" funds, and that upon this page shall be printed a brief history of the origin, money value and use to which the proceeds of each fund may be applied.

Mr. Whitney, in presenting the resolutions for the committee, emphasized the necessity of keeping the financial condition of the Association

upon a sound and self-supporting basis; that the income from annual dues, membership fees, and sale of proceedings only, should be used for current expenses; that as the Treasurer resided in Boston, it would not be wise to appoint the committee from California; and as it appears from the President's address that the expenses for the past two years had exceeded the income, it was a necessity that some definite plan or policy should be decided on before the next annual meeting. The Council could readily select a committee who, with the Treasurer, would adopt some method and enforce the action of the Association.

The report was accepted and the proposed resolutions were ordered to be considered *seriatim*.

The first resolution, directing rigid economy, etc., having been read, the Secretary read from the Treasurer's report that the cash balance on hand July 1, 1888, had been $2376, and after ten months, on 1st of May, 1889, $2946, an increase of $600.

THE SECRETARY.—I presume that the idea is that the surplus shall arise from the annual dues, not from other income?

MR. WHITNEY.—Yes, sir.

The Secretary moved the adoption of the first resolution, and the motion being seconded was carried.

The second resolution presented by the committee was again read, and on motion adopted. The same action was also had on the third resolution, after which the report of the committee was adopted as a whole.

President Alexander resumed the chair.

Mr. Wilcox, on behalf of the Nominating Committee, presented a final report, nominating for Local Secretary, Mr. Charles E. Dohme, of Baltimore; and for member of the Council for the unexpired term of President elect Painter, Mr. J. H. Redsecker, of Lebanon, Pa.

On motion, the Secretary was directed to cast affirmative ballots for the nominees, when they were declared elected.

Mr. Simmon gave notice of an amendment to Chapter IX. of the By-Laws, contemplating that the Sections on Pharmaceutical Education and Pharmaceutical Legislation be merged into one. The consideration will have to be deferred until the next meeting.

Mr. Eliel spoke of the increased cost this year for the printing of papers which were read at the present meeting, and moved that the printing of these papers be discontinued for the present. The motion was duly seconded.

MR. PAINTER.—I hope this motion will not prevail. One of the great advantages recently introduced, which I think has been appreciated by every one, was having a copy of the paper in hand when the paper was being read. It has enabled those who wished to discuss some particular point in it to note that point, and to refer to it during

the discussion. The value of reading papers at the meeting is mainly in the discussions; otherwise they may be read the next month in most of the pharmaceutical journals. I think this is well worth a moderate expenditure of money; if the expenditure has been excessive this year, it can perhaps be reduced so that it will be nominal. The first year when the papers were printed the cost was small. The type was set up by the printer of a journal with the distinct understanding that no use was to be made of this type until after the papers had been read before the Association, and that was strictly adhered to; but this type being already set up was valuable to that printer, and he could sell it to the journal that he was in the habit of printing. That is how the cost of the papers that year amounted to something less than $40. Last year the papers were printed by the Association printer, and the type was used for the Proceedings. This year it was not convenient to do so, being so far removed from the place of meeting. The bill seems to be rather extraordinary, though the estimates were submitted to those of the Publishing Committee who knew the proper cost for such work, and it was thought that the bid made was not excessive. I have the bill, and it is my intention to scrutinize it closely in accordance with the bid made, the figures of which I have in my possession. I hope this motion will not prevail until the plan has been tried a longer time to have the papers printed. It may be done, and should be done, at a less cost than the present.

THE SECRETARY.—It is well known that I am personally not in favor of printing the papers in advance of the meeting; but that I favor merely the printing of a brief synopsis of each paper for the use of the members present. The report of the Publishing Committee presented two years ago was written by me, and after full discussion was adopted by the Committee on Publication; it was in opposition to the proposition of Mr. Painter. However, as regards the expenditures for printing the papers, last year the total cost to the Association was only $15.50, and that was so low because the type was used afterwards for the Proceedings, and the Association had nothing to pay except the paper and printing. When the meeting was fixed for San Francisco, a serious question arose how the printing should be done. The Chairman of the Committee on Scientific Papers consulted with me, and I advised him to obtain estimates. These estimates were in strict conformity with the prices paid in the East for similar work. In view of the early date of the meeting, and time consumed in traveling from the Atlantic to the Pacific Coast, it was deemed impracticable for most of the papers presented here to have them set up in the East by the Association printer, to keep the type standing until used for the Proceedings, and to conveniently and cheaply ship these papers in time for the meeting in San Francisco. My past experience as to the date when papers are presented to the Committee and as to the express charges across the Continent are such that I had to advise the Chairman not to have them printed in the East, because in my opinion the cost would have been more than having them printed here. The large amount of cost in this case is due, aside from the fact that the type had to be set up, and afterward had to be distributed as being of no further use, that the number of papers and the number of pages of these papers is very much larger than heretofore.

MR. SIMMON.—I can see from what has been said that everybody has been trying to do the best he could. Circumstances have altered the case very much this year, still I think it would be better if instructions were given to follow the same plan heretofore followed, provided the expense does not exceed $100 at any one time—I think probably $50 would pay it, but I am willing to allow $100, and then the Association could afford to have the papers printed. It is very convenient to have the printed papers, but when this expense would be so great that the Association cannot afford it, it will be better to have the members take notes as the papers are being read. But I think it can be done as heretofore, and I will make an amendment to the motion, that the Committee shall have the privilege to print the papers at a cost not to exceed $100.

MR. ELIEL.—I accept that amendment.

MR. WHITNEY.—I rise to second the motion. I think after the adoption of the report recommending Council to use great economy in the expenditure of money, that we will leave the matter in as good a condition with the Council as in any other way.

The motion as amended by Mr. Simmon was adopted.

On motion of Mr. Painter, the Association resolved after final adjournment of this session to visit in a body the exhibits in another part of the same building.

In reply to a question by Mr. Whelpley, the Secretary stated that the resolution limiting the cost of printing papers for use at the meeting evidently meant to carry out the instruction of two years ago, to have the work done by the Association's printer, if it can thus be done to advantage.

No other business being presented, the installation of the officers elect being in order, the Chair appointed Messrs. Whitney of Massachusetts, and Calvert of California, to conduct the newly elected officers to their stations.

The committee introduced Mr. Painter, the President-elect.

THE RETIRING PRESIDENT.—In surrendering my badge of office to our new President, I do so with a great deal of pleasure, knowing that he will fulfil all of the duties, every one of them, and not neglect any. At the same time, in resigning this badge of office, I wish to thank the members of the Association for their universal courtesy to me during my term of office.

The President-elect expressed his thanks for the honor conferred by the election.*

MR. WHITNEY.—It seems to me eminently proper at this time that we should tender to our retiring President our hearty thanks for the able and courteous and successful manner in which he has conducted the deliberations of this body. I therefore move you, sir, a vote of thanks by rising, to the retiring President.

The motion was duly seconded, and the question being taken by President Painter, a rising vote of thanks was given unanimously.

The Committee introduced the first Vice-President-elect to the Association.

MR. SIMMON.—This is the second time I have been honored by this Association by one of the highest offices you have to bestow, and I feel that you might have made a better choice from among the able members you have to select from. As we have not a great deal of time for speech making this morning, allow me to thank you.

MR. ALEXANDER.—In the absence of the other two Vice-Presidents, the same Committee will escort the Secretary, Prof. Maisch, to the chair.

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* These remarks were not reported by the stenographer, and the prolonged sickness of Mr. Painter, after his return from California, prevented the Permanent Secretary from obtaining from him an outline of this inaugural speech.

SECRETARY MAISCH.—Mr. President, and members of the American Pharmaceutical Association: It has not, in the past, been customary for the Permanent Secretary to be introduced at each annual meeting after the election; but on the present occasion I should have requested the privilege of saying a few words. To say that I heartily thank the members of the Association for the confidence that they have bestowed upon me by reëlecting me every year to this office is saying but very little. I can assure you that my best endeavors have in the past been given to the Association, and as long as I shall remain a member of the Association, I shall certainly continue in that line. It was in the year 1864, just twenty-five years ago, at the meeting in Cincinnati (and I may be permitted to state here in parenthesis, that out of thirty-seven meetings that have been held by the Association, I had the privilege of attending thirty), in 1864, the Association appointed a committee to revise the Constitution. That Committee reported subsequently a constitution which was acted upon by the Association at the meeting held in 1865, in Boston. The Constitution then adopted provided for the first time for the election of a Permanent Secretary, and states—the clause having been retained to the present time—that the officers, "with the exception of the Permanent Secretary," shall be elected annually. But another clause of the Constitution which since 1870 has been transferred to the By-laws says, the Permanent Secretary shall hold office at "the pleasure of the Association." The Association has violated the letter though of course not the spirit of its Constitution since that time, by re electing the same Secretary every year. At the meeting in 1865, I had not the remotest idea that the choice of the Nominating Committee for the position of Permanent Secretary would fall upon me; in fact, my relations in life at the time were of such a nature, that I could scarcely expect to fulfil the duties; and though I protested in open meeting against being elected, I was persuaded by the members to accept the position, and I did accept it. The duties, however, became quite ardous in the course of time, and at the meeting held in Chicago, in 1869, I requested the then President, Edward Parrish, to announce in his annual address my resignation as Secretary, with a view of its taking place at the following meeting. After the announcement had thus been made by the President, several of the old members requested me to withhold the action upon that resignation at least for the term of two or three years, and thus it came to pass that I retained the office, until finally in 1872, three years afterwards, I consented to withdraw the resignation, which was announced by President Enno Sander. Many of the those old members are no longer among the living. Since that time, I have repeatedly felt as if I ought to resign, and there are members present here who know that such has been my wish in time past, and they know also, to a certain extent at least, the reasons that have kept me in office. But now, Mr. President, the Association has elected me for the twenty fifth year. The next annual meeting will complete my twenty-five years service as your Permanent Secretary, and I think it is not more than just to myself, as well as to the Association, to request you to relieve me from these duties and to accept my resignation, to go into effect at the next annual meeting. Gentlemen, I thank you very heartily.

MR. WHITNEY.—Mr. Chairman, if it is proper at this time, I would suggest to our Permanent Secretary the same action that he took some years ago, when he was requested to withhold his resignation for a period of three years.

THE CHAIRMAN.—I think it is an excellent suggestion.

SECRETARY MAISCH.—I heartily thank Mr. Whitney and the Association for that expression of kindness, but I should prefer that the Association would consider that for at least one year.

A vote of thanks was proposed to the retiring officers.

MR. EBERT.—I rise to make the motion that we heartily thank all the retiring officers for the work they have performed during the last year, and especially the Local Secretary of the Association, Mr. Runyon, for the work he has performed in bringing this meeting to such a successful issue.

The motion was duly seconded, and, being put by the Chair, was carby a unanimous rising vote.

MR. RUNYON.—I thank you very much, gentlemen, for the vote you have taken. This work has been a work of love on my part, and if ever you meet in San Francisco again, I should like to be your Local Secretary, because I think I could do it better than I have done this time. The work has been made easy by the kind labor and willing attention that have been given me by the local druggists. I thank you heartily for your kind expressions.

MR. ALEXANDER.—Mr. President, I now move, sir, and ask for a rising vote, that our hearty thanks be extended to the druggists of the Pacific Slope, and to their wives, and to those ladies who assisted in the management and in making our attendance here so delightful, the recollection of which we will all carry away with us as a memory to be recalled in future years as one of the pleasantest incidents in our lives.

The motion was seconded amidst applause, and was carried by a unanimous rising vote.

MR. EBERT.—It is due that we also extend a vote of thanks to the daily press of this city for their reports of our sessions, and to the citizens at large, who have shown us many courtesies.

Mr. Ebert's motion was seconded by Mr. Eliel, and was unanimously adopted.

On motion of Mr. Maisch, the President was requested to appoint three delegates to the Decennial Convention for the revision of the U. S. Pharmacopœia, which will meet in Washington, in May, 1890.*

In answer to a question by Mr. Hallberg, whether it would be proper to appoint delegates to the American Medical Association, in case that body inaugurated a pharmaceutical section, the Secretary stated that at the last meeting a committee was appointed to bring to the notice of the American Medical Association the National Formulary (see Proceedings 1888, p. 126), and that the President has authorized that Committee to act in such emergencies.

Mr. Alexander moved that the Council take all necessary action in case a Section on Pharmacy should be organized by the American Medical Association, and action should be required by this Association.

The motion was seconded and adopted.

Mr. Simmon moved that the Committee on the Revision of the U. S. Pharmacopœia be continued another year.

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* After the meeting adjourned, President Painter appointed for this delegation, Dr. E. R. Squibb, Brooklyn; A. E. Ebert, Chicago, and Chas. Mohr, Mobile, Ala.—*Permanent Secretary.*

The motion was seconded. Mr. Ebert desired to be relieved from serving further on this Committee, but the motion was carried.

The President stated that the Local Secretary elect, not residing at the place of next year's meeting, desired the appointment by the Association of a Committee on Arrangements to assist him.

The Secretary moved that the President, after consultation with the Local Secretary, appoint a committee of five, of which committee the Local Secretary shall be chairman.

The motion was seconded and adopted.

Mr. Searby, the second Vice-President elect, being present, was conducted to the chair, and introduced to the Association.

MR. SEARBY.—Mr. President and Gentlemen, I thank you very much for the honor conferred upon me, unworthily so far as I am concerned. Unworthy as I am to receive it, I thank you for this honor, and trust that the Association will find that their officers who will be present next year will be able to transact satisfactorily all the business of the meeting. I may be present with you next year, but that is something doubtful; but however that may be, you will have my best wishes, and I will be present with you in sympathy and in heart, even if not in the body.

Mr. Ebert spoke against entertainments being projected in the name of the Association, and suggested that they might and could be arranged by clubs formed by the members; he more particularly desired that on behalf of the Association no arrangement be made for a banquet.

Considerable discussion took place, in which Messrs. Steele, Alexander, Manning, Whitney, Robinson and others participated.

Mr. Whelpley moved that the Committee on Arrangements confer with the Permanent Secretary, and arrange the sessions and entertainments so as not to conflict with the business of the Association.

The motion was seconded and adopted.

Mr. Ebert moved, seconded by Mr. Alexander, that the Committee on Arrangements make no provision for amusement. This was carried.

Mr. Alexander moved, seconded by Mr. Whitney, that the Committee on Arrangements be also appointed a Committee on Entertainments.

An amendment was made by Mr. Ebert, seconded by Mr. Hallberg, that whatever arrangement for entertainments be made by such Committee, no member of the Association be deprived from participating in the entertainment, whether he contributes towards it or not.

The question being on the amendment, and a division being called for, the amendment was lost by 14 ayes to 24 nays. The original motion was then adopted.

No further business being brought forward, the Secretary read the minutes of the last session, which were approved; after which, on motion of Mr. Eliel, duly seconded, the Association adjourned, to meet again at Old Point Comfort, Virginia, on the second Monday of September, 1890.

MINUTES

OF THE

SECTION ON COMMERCIAL INTERESTS.

FIRST SESSION.—TUESDAY AFTERNOON, JUNE 5.

The Chairman of the Section not being present, Mr. Eliel took the chair at 3 o'clock p. m. The Secretary of the Section being also absent, Mr. J. H. Dawson, of San Francisco, was elected Secretary.

The following report was then read :

REPORT OF THE SECRETARY OF SECTION ON COMMERCIAL INTERESTS.

Your Secretary reports that the Association meeting as it does so much earlier than usual, prevents as full a report of work accomplished as could be desired.

Immediately after my return from the meeting at Detroit, as instructed, I conferred with the President of the N. W. D. A., Mr. G. A. Kelly, being unable, as I hoped to do, to reach Saratoga on my return, until after the adjournment of that body, asking his co-operation in urging upon manufacturers the need of labelling their products in conformity with the officinal nomenclature of the United States Pharmacopœia, designating strength by specific gravity or percentage strength, abolishing such marks as F. F. and Baumé.

I am pleased to say that already several of our prominent manufacturers have adopted the suggestions made. In all probability it will soon become general.

Few matters solely of commercial interest have during the interim presented themselves.

In conjunction with the Secretary of the Section on Legislation, strenuous efforts were made to secure the repeal of the special tax as retail liquor dealers, but without any appreciable results.

The most that we secured seemed to have been promises. There is usually no shortage in this crop.

A lengthy and earnest correspondence, extending over several months, was carried on with prominent Congressmen in the effort to prevent the passage of what seemed to me to be an iniquitous bill for securing free alcohol, to be used for mechanical and medicinal purposes, in the interests of large manufacturers, to the manifest injury of the retail trade. It passed the Senate, but fortunately failed in the House.

I recommend that the subject be thoroughly investigated, as it is probable that it will be introduced at the next session of Congress, when it should receive the united opposition of the Association. Should it become a law, I predict wide-spread loss to the retail

trade of the country, who would be unable to compete, with taxed alcohol as they would have to, in competition with large manufacturers with alcohol free from taxation.

As will be seen by the report of the chairman of the standing committee, several important subjects were submitted, in accordance with our By-laws, to the various State Associations. It is hoped that wise and decisive action may be taken by the Association in regard to them. It is recommended, as giving greater weight and influence to this Section, that an addition of one (preferable the Chairman of the Trade or similar committee) from each State Association be made to our standing committee as an advisory board, with the suggestion that the chairman hold frequent communication with the individual members thereof. I think this would be of great advantage to the Section, and secure better results all around. It seems to me that one reason that more has not been done by this Section is due to the fact that there is a lack of uniformity on the part of the State Associations and lack of proper co-operation on our part.

I also recommend that a sum not exceeding $500.00 be placed at the disposal of the joint committees of Commercial Interests and Legislation, not to be drawn upon without the consent of the President of the Association and the respective chairmen of the sections. These two sections are unavoidably closely allied, and must perforce often work together and in harmony.

It needs not that I call your attention to the fact that it is a useless expenditure of time and labor to fight battles without proper ammunition.

Respectfully submitted, J. W. COLCORD,
Secretary Section on Commercial Interests.

The Chairman also reported that the sub-committee of the Section had sent out the following letter to the various State Pharmaceutical Associtions:

SOUTH BEND, IND., *April* 27, 1889.

Dear Sir: By direction of the Chairman of this Section, I beg leave to submit the following questions to you, with the request that you submit same to your Association, and report action thereon, and such other matter as you may desire to bring before this Association, at your very earliest convenience. Mail to me here if not later than June 3d, 1889; after that date and not later than June 20th, to San Francisco, Cal., care of Palace Hotel.

1st. Does your Association approve of the attempt to repeal the special Government tax for sale of liquors?

2d. Does your Association approve of the attempt to reduce tax on alcohol?

3d. Does your Association approve the rebate plan as applied to proprietary articles, and does it consider it of any benefit to the retail dealer?

4th. Does your Association deem it practicable to attempt some plan by which the legitimate retail dealer may be protected in his profits on proprietary goods, and will your Association suggest a plan to this effect?

5th. Does your Association favor the interchange of certificates by Boards of Pharmacy, to those who have passed by examination? If so, will you take steps to have your Pharmacy law amended?

6th. Does your Association favor a National Pharmacy Law?

Any suggestions which would come under the head of "Commercial Interests," which your Association would like this Association to take action on, or anything that would tend to increase interest in the Commercial Section of the A. P. A., I shall be glad to receive. Awaiting your reply,

I am sincerely yours, LEO ELIEL.

The Chair stated that replies had been received as follows:

	1	2	3	4	5	6
North Carolina	No.	Yes.	No.	. .	Yes.	No.
Illinois	Yes.	No.	. .	. .	Yes	
Rhode Island. Meets later. No reply.						
Connecticut	Yes.	Yes.	. .	. .	Yes.	
Massachusetts	Yes.	Yes.	No.			
Florida	Yes.	Yes.	. .	. .	Yes.	
Dakota	Yes.	Yes.	. .	. .	Yes.	
Dakota South	Yes.	Yes.	No.	. .	Yes.	Yes.
California	Yes.	Yes.	.	. .	Yes.	Yes.
Delaware	Yes.	Yes.	Yes.	. .	No.	Yes.
Nebraska	No.	Yes.	Yes.	. .	No.	No.
Arkansas	No.	No.	Yes.	Yes.	Yes	Yes.
Iowa	Yes.	Yes.	Yes.	Yes.	Yes.	No.
New Jersey	Yes.	Yes.	. .	Yes.	No.	No.

The questions were then taken up for discussion separately.

Upon question number one, it was resolved that the Section on Commercial Interests does approve of the attempt to repeal the special Government tax for the sale of liquors.

The second question having been read, some of the members expressed a desire to learn why the Illinois Association was not in favor of a reduction of the tax.

Mr. Bartells.—I was at the Peoria meeting last year, and I was at the meeting of the distillers. The distillers are opposed to the tax being reduced. I think the retail druggists would favor the reduction, but the manufacturers object to it. It is a great source of wealth to the combination, and that is the only reason of their opposition. They don't care anything for the needs of science or for the retail trade. That is my opinion. I have talked with one of the proprietors of a large western distillery, who thought that reduction of the tax would ruin their business and trade.

Mr. Kilmer.—In New Jersey we understood the question was a reduction, and not the entire repeal of the tax on distilled spirits. We did not favor a reduction, but would ask for the entire repeal. That was the sense of our meeting.

Mr. Melvin.—Did the distiller conversed with upon the subject give reasons why it would injure their business? It seems to me that the tax goes to the United States, not to the distiller, and I cannot see any possible advantage the distiller could receive.

Mr. Bartells.—The distilling business requires a great deal of capital, and they are nearly all combined and controlled by very few persons. If the tax on distilled spirits were repealed, small distilleries would start up all over the country. It would cost very little to buy a still and make alcohol, corn, water and fuel being plenty. But running the distilling business as it is now run requires an immense amount of capital, and the profits are accordingly large, because they control the business.

Mr. Painter.—A similar state of affairs existed in the match industry. The manufacturers of matches opposed the taking off of the stamp tax from matches very strongly indeed, but it was finally accomplished against the monyed effort.

Mr. Manning.—There is still another matter that should be considered in this connection, and that is the conflict that is now on between the brewing and the distilling interests in this country. There is a very bitter fight that has not come to the surface yet, and whatever represents the interests of distillers, is antagonistic to the brewers. I have been told by a United States Senator, that the minute they attempt to legislate on this subject, they antagonize many other interests. The brewing interests have lobbied thoroughly and effectively; they are looking out for their own rights. and they propose to put the distiilers in the pocket if possible. This gentleman with whom I had some conversation, says he don't see that the next session of Congress will do anything in the matter.

Relative to the vote of the State of Massachusetts, I think the sentiment of the State Association was this: That this being a war tax, as a matter of principle it ought to be repealed—there is no use for it. But from a business standpoint it would be detrimental to the retail druggist to have this tax repealed. In the East, where the cutters are numerous, anything that tends to reduce the price must necessarily tend to reduce the profit, because the larger the cost the greater the capital must be to provide for the proper handling of the goods; and if the tax is reduced, it is thought by many in the East that this will only add one to the many troubles under which the retail druggists are now laboring.

Mr. Calvert.—I will ask whether it is intended for our Association to adopt a bill upon this subject, if we should get an expression of opinion favorable to it.

The. Chairman.—That is the reason why this matter has been brought up. It is the only way that legislation can be influenced.

Mr. Calvert.—Mr. Painter just instanced the case of matches, where there was a very strong trade opposition to the removal of the tax. It strikes me that we had a somewhat similar instance in regard to patent medicine stamps. There was a long and bitter fight about that, and the makers had to give way. I understood that they were the persons who opposed the abolition of the stamp. It seems to me we should look, not to the interests of the distillers, but to the interests of the retail drug trade and the manufacturing chemists. We have had this matter before the California Pharmaceutical Association on several occasions, and to the best of my recollection we had a very unanimous opinion on the subject, that is, for the abolition of the tax. We don't think it does us any good to have this tax on alcohol. If we have to use anything with alcohol in it, it costs us more money, and at retail we would get just as much for our manufactured products which are made through the agency of alcohol as we do now: I don't see any valid reason why we or any other State organization should cast our vote in favor of keeping the tax on alcohol.

Mr. Melvin.—In order to bring this matter properly before the meeting, I move that it be resolved that it is the sense of this Association that there should be a material reduction made in the tax on alcohol, and that the matter be referred to the Legislative Committee of the Association, with instructions to take the necessary steps to secure such legislation.

Mr. Manning.—Before that motion is put, I would like to state that this matter was first taken in hand at the meeting of the wholesale druggists in 1886. They drafted a bill, which was presented to Congress, and, in response to their memorial, Representative Hiscock, now United States Senator from New York, drafted a bill, which was referred to the next Congress. This whole matter is before the legislative body and will come up in due time. Of course, any increased weight that this Society may see fit to add to that senti-

ment may probably materially help; but in regard to drafting of a legislative bill, that has already been done.

DR. MELVIN.—I did not propose the Committee should draft a bill, but take the matter in hand and endeavor to secure legislation in that direction.

MR. BARTELLS.—I second your motion, and offer the amendment that there should be a total abolition of the tax.

DR. MELVIN.—I will accept your amendment.

MR. BARTELLS.—There has been strong opposition to the reduction of the tax for temperance reasons. The argument was, that a reduction of the tax on alcohol and liquors would be followed by a great increase of intemperance, although it is claimed that if it took millions of dollars the distillers would retain the tax if they could control Congress. In regard to the decreased profit, it would be just the other way. There would be fifty to one hundred per cent. profit added to the retailer, instead of a decrease. We must speak to be heard, and, if we don't say anything, of course we will go right along as we are ordered, instead of asserting our rights.

MR. CALVERT.—Mr. Chairman, might I suggest, as the gentleman from Massachusetts states that there is a bill now pending before Congress, that we get up a petition to Congress emanating from the American Pharmaceutical Association, that is to say, if we have a sufficient number who favor it. I think that a petition of that kind emanating from this body might do some good, especially as going there to back up a bill. I merely offer that as a suggestion, instead of making a separate motion.

MR. KUHN.—For my part, I think the Association makes a mistake in trying to reduce the tax on alcohol: I believe it will make quite a difference. The alcohol is under government control—that is, the distilleries are all watched carefully and the whole liquor question is under the surveillance of the government. I think in the interests of temperance there should be a tax, and a good heavy tax, on alcohol. So far as making it more profitable to the drug man by reducing the tax, it will not do it. It will be just as it was with quinine. When they took the duty off quinine, the price fell more than the amount of the duty removed; it fell in retail in my place ten times what the duty had been. The prices of quinine preparations were reduced just one-half almost immediately; and I think you will find it the same way now, there will be a decline in price. Therefore, I believe that it will be a bad business move to reduce the tax, and I think if the gentlemen would look at it carefully, and weigh it, and consider it, and taking quinine as a precedent, they will find there will be a decrease of a very material amount; that where a tincture is sold for fifteen cents an ounce, including the bottle, they will find that the reduction of the alcohol tax will put it down to ten cents, and other things in the same proportion. Therefore, I move that the resolution be laid on the table.

The resolution to lay on the table was seconded.

MR. MANNING.—The reduction in the price of quinine came from the increased production of bark in the Dutch and English plantations. The first importation of bark from those plantations was less than thirty pounds in 1876; in 1885 it was fifteen millions. The duty had nothing to do with it; that business enterprise has reached such a growth now that there is nothing in it for anybody.

MR. KUHN.—I don't think I am mistaken. I understand what the cultivation of the bark yields; but it is always the last straw that breaks the camel's back, and the removal

of the duty was just what was wanted to bring down the price of quinine one-half, and it did it very effectually.

Mr. Melvin.—I differ materially with the gentlemon who made the motion to lay upon the table. According to his theory; if the tax of $1.80 a gallon enhanced the profits of druggists, to double that would double the profits of druggists I suppose, and you could carry it on *ad infinitum*. But I am convinced if the tax were abolished entirely on alcohol, or reduced to 60 or 75 cents per gallon, we would get just about as much for our tinctures, elixirs, and all preparations into which alcohol enters, as we do now, and make much larger profits. It is a tax that is not necessary for the support of the government. It is a tax that was enacted during war time, as we all know; and now that the government is troubled with a surplus and don't know what to do with it, it seems to me it would be quite proper for us to ask the government to repeal the tax on alcohol, they don't need it; and I think it will be for the interest of the retail druggists.

Mr. Searby.—We are in danger of mixing up two things, that have nothing to do with each other, every time we discuss this question—namely, the temperance question and our own interests. We cannot settle the temperance matter by this kind of legislation; we cannot tax people into sobriety. If drinks cost half a dollar apiece, some men would be drunk half the time. The question we are interested in just now is that of manufacturers using alcohol in their business. The matter of putting a tax upon alcohol in view of temperance interests is a police matter, and that is entirely out of our range in the present discussion. I am not so sanguine as some of our friends are that the repeal of the tax would increase our profits materially, but still I think it would to some extent. I see no reason why persons in our business should be subjected to the $25.00 a year tax, and this additional tax on all the alcohol we use, interfering with us in our business, when there is no need of it. I think we are entitled to carry on our business under every advantage, the same as other dealers and manufacturers do. Therefore, I favor the motion to repeal the tax.

Mr. Hallberg.—The illustration of Mr. Kuhn in regard to quinine is a very good one, and may be applied to the reduction in the price of alcohol. Of course the reduction in the price of quinine was more due to the improved manufacturing processes and the increase in its manufacture than to the abolition of the duty. At the same time, that great reduction is a good illustration, no matter what the cause of it was—a good illustration of what the result will be should we materially reduce the tax on alcohol, or abolish it entirely. Medicines are different from any other form of merchandise. Lowering in the value has a corresponding increase in consumption in nearly everything else except drugs. A man don't buy any more medicine because it is cheap; he buys it because he wants it. They don't buy, I believe, as much quinine now as they did when it was worth a great deal more, and I think there are a good many new-fangled things which have further reduced the consumption. Now, then, we have no increased consumption. We have a profit; but even if the ratio of profit was the same, say the customary four hundred per cent. that we druggists are credited with, we do not make near as much as we do on a higher, or on an artificial value.

Now, I am opposed to artificial values; but as long as we have artificial values on everything else, I want artificial values in the drug business. If we have to have low or natural values on alcohol, which you might say governs the price of all pharmaceutical preparations next to that of labor, and we have artificial and high values in everything else, we are going to represent an abnormal condition as opposed to every other mercantile industry in the country except the agricultural. Therefore, while I am in favor of abolishing the tax on alcohol, I am not in favor of doing that until we abolish the tax

on everything else, or nearly everything else, so as to put ourselves on the same plane as other producers in this country.

MR. PAINTER.— There is another reason why this tax should be taken off, as far as the retail pharmacist is concerned—it does not make so much difference to the large manufacturer. In making fluid extracts the price of alcohol is so decidedly against the small manufacturer that it does not pay him to recover the amount of spirit in making, say a single pound, of fluid extract. It is not against the large manufacturer, who, operating on a large scale, recovers his spirits. If the tax was removed, every retail druggist could make his own extracts cheaper than he could buy them, and then he could vouch for them.

MR. BARTELLS.—I would ask what other tax Mr. Hallberg refers to?

MR. HALLBERG.—I have reference to the high tariff, which is about forty-five per cent. I recognize the point raised by Prof. Painter, and it is the only argument in my opinion. At the same time it is not long enough nor strong enough. Nearly every alcoholic galenic preparation has the cost governed by the cost of alcohol; it is the greatest element next to labor; but the loss of alcohol in the making of fluid extracts, on a small scale, by a skillful manager, is very small, and may be reduced to a minimum.

MR. BEDFORD.—What other tax do you allude to that in any way compares with the tax on alcohol?

MR. PAINTER.—The tax on tobacco.

MR. BEDFORD.—The tax on tobacco has been partly removed, as I understand it.

MR. HALLBERG.—In order to discuss that we would have to go into political economy, a question which I am not competent to discuss. I mention the abnormal values existing in this country, because of the presence of a high protective tariff that governs our condition, and therefore, we cannot afford to handle anything on its bare natural value. If we do we will get left, unless we can largely increase the consumption, and that we cannot do in our business.

MR. MELVIN.—My motion was to this effect, that the Legislative Committee of this Association be instructed to take such steps as they may deem necessary to secure an abolition of the special tax on alcohol.

MR. MAISCH.—The Committee on Legislation is the executive of a Section of this Association, co-ordinate with the Section on Commercial Interests. I doubt whether this Section has the right to *instruct* another Section of this Association. You can instruct a special committee, if you choose to take that step, or you can refer the subject for consideration to the Section on Legislation, but you cannot instruct another Section.

MR. CALVERT.—We can take a vote of the sense of this body as it stands now.

MR. SEARBY.—May I make a suggestion? Can we not vote at this Section that we favor the repeal of the tax, and if that prevails, cannot the Chair appoint such a Committee?

MR. MELVIN.—I will change my motion so as to come within the rules of the Association, and move, with the consent of the party who seconded the motion, that the Section on Legislation be respectfully requested to take such action in reference to the abolition of the revenue tax on alcohol as the sentiment of the American Pharmaceutical Association indicates.

The motion was adopted.

In connection with question number three, there were also read portions of the Secretary's report and a communication from Messrs. French, Richards & Co., of Philadelphia, the latter accompanied by a printed circular.

MR. PAINTER.—I think that this rebate plan has done more to foster the cutter than any other thing. It discriminates against the smaller retailers, comprising the largest number of pharmacists, and in favor of the large retailer, of the man who is not a pharmacist at all, or of him who can place himself on the wholesale list, and who then sells his goods at a profit of ten per cent., cheaper than his competitors buy them. For instance, preparations selling at $8 a dozen are sold by the hundred dollars' worth at ten per cent. discount; the purchaser can sell them at 65 cents and make a profit, while his competitor has to sell them at 67 cents in order to get bare cost back again. Every man who sells such goods should be placed upon the same footing; and the only way to do it is for the manufacturer to establish one fixed price for those who buy goods, and if a man retails at all he should be obliged to pay the same price as his competitors in business. In France a package price is given, and. the man who buys the original package can compete with any one else who handles those goods. Such a plan would be a benefit, not only to the retailer, but also to the jobber, because the retailer would buy through the jobber, as it would cost him just the same as from the manufacturer.

MR. KUHN.—This is a pretty hard question, but I think that a man might say with equal force that my friend here from New York should not know any more than the man from the wilds of Arizona who has never seen a drug journal. The buyer who has the money will get the price, and I think that a man who is a good buyer ought to make a little more money than the one who does not try to get a better price.

MR. MANNING.—I would like to inquire through the Chair of the gentleman who has just spoken, if he has any contract with the cutters we have spoken of. I find that those gentlemen who have marched in procession when the cutters were furnishing the music have very definite ideas of this matter.

MR. KUHN.—I will state for the benefit of the gentleman that we have not any cutters in our locality, that we are all on pretty good terms, and try to keep that way, and when any one cuts a price we generally talk to him and make him tired.

MR. MANNING.—I thought as much, and I can only repeat what I have said before on many occasions, that this is a very large question. There are bodies of men in the retail drug business, especially in the East, who have made some of us walk a very hard and bitter road. How they can be whipped into line, is a question that we have not been able to answer before. Perhaps some of our friends in the West can solve the question. It is certainly one that I would advise them to have solved before the cutter takes up his dwelling place among them, for their ideas then will be materially changed.

MR. KILMER.—We have the cutter all through New Jersey, and some of us who happen to be located between New York and Philadelphia get cutters from both ends. We have also in the State Association of New Jersey tackled this same question. It is a very large question. We started out at first to break down the system, and we found out that we were antagonizing the Wholesale Association and the Proprietary Association, and that the great majority of the retailers were not benefited at all. In the State of New Jersey there were scarce half a dozen men who had trade enough to take advantage of the rebate prices. By careful census, we found that there were cutters coming from Philadelphia and New York. A man would have a store at Philadelphia, and

would start half a dozen branches through New Jersey and Pennsylvania; he would buy goods in large quantities and take advantage of the rebate, and when we attempted to antagonize him they put us on the black list, and the cutter was allowed to go on and secure even better discounts than before, because he was doing a bigger business.

I believe there are about thirty-five thousand pharmacists in the United States, and I believe the rebate system is directly against the interests of thirty thousand of them; but I don't think it would do any good for any State Association, or any association of retailers, to attempt to break it down, because it is to the interest of the wholesale dealer and the proprietor. The only thing that we found possible was that we might get it modified so that we might get a cold pittance, or a few crumbs from the table. Therefore, the New Jersey Association adopted the plan suggested by French, Richards & Co. Thinking it might afford some relief, we endorsed it, and it was referred to a committee to assist in placing it before the proprietors. The plan is that the man who advertises to sell at less than the full price is to be cut off from obtaining the goods. His advertisement in the newspaper or in a circular is to be sufficient evidence to the National Wholesale Druggists' Association or the proprietors, whereby he is to be cut off from the rebate. The price marked in his windows, or anything that could be taken as an advertisement, is sufficient. All the evidence necessary is to forward his price list to the committee, and that cuts him off at once. For that reason I would favor that plan, particularly because it comes from the wholesalers, and because I believe they are going to hold on to the rebate system as long as they can. And I don't blame them; it gives them a certain secured price for every proprietary article; and if we had such a thing we would hold on to it too. This proposed plan has the merit, that its backers are endeavoring to get it endorsed by the National Wholesale Association, and if they succeed it will help us in New Jersey a little bit. We figured it up once, and found that the combined lot of us in New Jersey were fifteen thousand dollars out of pocket in one year by a branch of a Philadelphia house, so that we are willing to accept almost anything; and I tell you if the gentleman from Omaha ever comes under the ban of a cutter like that, he will be aroused up to what this interest means to the retail druggists. In the State of New Jersey we could scarcely rouse up any scientific interest among the druggists when it was so hard for them to make a dollar, but our Association has become greatly interested in mercantile interests and has taken hold of this plan, hoping that we may add a few dollars to the pockets of our fellow pharmacists.

MR. MANNING.—I don't think it will be amiss to state for the benefit of our western brethren the manner in which advertisements injure retail druggists. In Boston, during the month of March, a large concern, known as the Massachusetts Co operative Cachou Company, put a half-page article in the newspapers, in which they stated that on the following morning they would place a certain syrup of hypophosphites at 75 cents per bottle. That came to the attention of one section of the wholesale drug business in Boston, and they made arrangements to follow it up. The next day eleven young men called each for a bottle. One bottle was all they would sell under any circumstances to one customer. They could not get any; it was said that all had been sold. Monday they called again, and they succeeded that day in getting two bottles. They followed that up for ten consecutive days, excepting Sundays. That made one hundred and ten calls, in which they got nine bottles—that is all. In each instance they were put off, and finally they ridiculed them. But what was the result? We felt that in every town in the State. In my own town, which was one hundred and fifty miles away, before Monday afternoon we had a call at that price, based upon the advertisement in the Sunday papers. It was intended to deceive, that is all there was to it; they wanted to get the customer within their doors, and if they could not sell him that they would sell him their own preparation, telling him "that is all gone, here is our own, which is just as

good, or better," or they would endeavor to sell him something else. The sole desire was to bring the people there. The suggestion of my friend as to the plan of French, Richards & Co., is a very strong one; I think it should meet with the endorsement of this meeting.

MR. PAINTER.—There is certainly no objection to endorse it, but it would be very hard to carry it out. It would be easier to accomplish the plan, which is in the interest of the jobber, of making every man who retails pay the same price for the goods: then we are all placed on the same footing. If I am not a cutter myself, I have all the symptoms without the disease. I sell pills at 12 cents, because my competitor sells them at 12 cents, and I don't allow anybody to get ahead of me in that direction; I keep my customers if I can. Many of my competitors pay 12½ cents by the gross for them, still I can sell them at a profit at 12 cents. Likewise, I can sell sarsaparillas at 65 cents at a small profit, whilst some competitors pay 67 cents for them. I could go through a list of a great many others. It becomes absolutely necessary for me to do this, in order to protect my business. The wholesale men to a man, and the jobbers, would go into such a scheme, I think—not to allow any wholesaler to sell goods at retail, and to sell to all men who retail at the same price. If the manufacturers can be induced to go in, it will be a great accomplishment, and I have spoken to several of them, and found them quite willing to put their hands and heads together in favor of such a scheme.

THE CHAIRMAN.—Such a plan might work very well in large cities, but it will hardly work in the far West or in the South, nor will it work in the central States, where there are so many houses doing a jobbing business in connection with their retail business. They would be compelled to give up their jobbing or their retail business, and their success in trade might depend on both combined, where there is not sufficient trade to maintain an exclusive jobbing house, and where it would be necessary to carry a jobbing stock to supply the neighborhood. Would not that work a hardship?

MR. PAINTER.—It does appear that it would be a hardship in certain localities, to some who are jobbers and at the same time retailers. I have been viewing the subject from the standpoint of cities where we have come in contact with the cutter, whose business could not have been maintained in its present condition without being assisted by this rebate plan which is not extended to the retailer.

MR. BARTELLS.—I think this whole matter of proprietary medicines has assumed too large proportions. There are two things which are very distasteful to me; one is that I must annually apply for a retail liquor dealer's license, and the other is that I have to be asked again and again every day to recommend some patent nostrum. They want the endorsement of the seller. I used to do that somewhat, but I have got bravely over it, and anybody who buys such stuff buys it on its own merits, or on their own hook. I think that this body ought to give some expression disapproving of all proprietary medcines unless they are labeled with the contents. I often feel as if each man were responsible for the harm that such a medicine may do; but the more we have to do with it the worse we are off, and if we could shake off the whole matter and sell something that is worth buying, that would afford relief to all.

THE CHAIRMAN.—Gentlemen, about forty per cent. of the total business, speaking in a commercial sense, consists of proprietary articles, and perhaps twenty-five per cent. of the trade is selling that forty per cent. at absolute cost and a good many goods at a loss. It is merely a commercial question, it is not a professional question at all. We depend for our bread upon the profits of our business. As long as we must handle these goods,—and we certainly do have to handle them to a very large extent,—we had better try and do so at a

profit. The proper thing to do would be to devise some way of obtaining a profit. Gentlemen, what is your pleasure in this measure?

MR. MELVIN.—Mr. Chairman, it strikes me after listening to the arguments on this question, that perhaps the better plan would be to adopt and recommend the plan, and I therefore move you, sir, that we approve the plan proposed by French, Richards & Co.

The motion was seconded by several members.

MR. MAISCH.—Mr. Chairman, I did not propose to speak upon this question at all, but before this Section takes any action on this proposition, I should like every member present to examine very carefully the wording of it. There occurs, for instance, the expression, "established legitimate proprietary remedies and imitations of the same." Can you tell me what that means? I do not know. Possibly some nostrum that has been very largely advertised and has gained a foothold and is known all over the country—I presume that is intended to be classed as a legitimate proprietary medicine; while a nostrum that has just begun to start and has not been advertised, and has not secured a market for itself, I presume that is not considered to be an "established legitimate proprietary remedy." On the other hand, suppose there are a number of so-called legitimate sarsaparillas, and a member intends to put up and recommend his own sarsaparilla syrup, is that an imitation of those established leitgimate sarsaparillas? I desire for the good of the Association, and of every member of it, that every word used in the proposition be carefully examined.

MR. PAINTER.—I suggest that the motion be made to cover as many points as may seem desirable, so that we may know exactly what we are debating.

MR. BEDFORD.—I suggest that this matter be referred to a committee of three, to bring in a resolution to-night, which will cover the ground that seems to meet the views of those here present—then discuss that, and adopt it or discard it at once.

MR. MELVIN.—That is a good suggestion. I will accept that in place of my motion.

This motion was adopted, and the Chair appointed Messrs. Forsyth, Kilmer and Manning as the committee.

An invitation from the State Viticultural Commission to visit their exhibits at Platt's Hall was read, and, on motion, duly seconded, the invitation was accepted with thanks.

Question number four, on motion, duly seconded, was referred to the same committee.

Questions number five, relating to the interchange of certificates, and number six, in reference to a National Pharmacy law, were, on motion of Mr. Painter, duly seconded, referred to the Section on Pharmaceutical Legislation.

A letter was read from Mr. T. D. Crawford, in reference to the selling of morphine, cocaine, and similar compounds without the prescription of a physician. On motion, it was referred to the Section on Legislation.

Nominations for officers of the Section were then made, it being understood that the nominations be opened again at the next session. Mr. Leo Eliel was nominated for Chairman, and Fred. B. Kilmer for Secretary.

On motion of Mr. Painter, the Section now adjourned, to hold the next session in one of the parlors of the Palace Hotel.

SECOND SESSION—TUESDAY EVENING, JUNE 25TH.

The Chairman called the meeting to order at the Palace Hotel. In the absence of Secretary Dawson, Mr. Bedford was appointed Secretary *pro tempore*.

Several members stated that members were waiting in the meeting room at Odd Fellows' Hall, not knowing that the session had been called at another place.

On motion of Mr. Bedford, the Section then proceeded to Odd Fellows' Hall. Mr. Dawson acted as Secretary.

The nominations for officers were again opened, but no further nominations being made, the Secretary was, on motion, directed to cast affirmative ballots for Mr. Eliel as Chairman, and for Mr. Kilmer as Secretary of the Section.

Messrs. Ebert and Main were appointed a committee to conduct the officers elect to their seats.

THE CHAIRMAN.—I thank you for the honor you have conferred upon me, and I assure you it is a position which has been entirely unsought on my part, and that I would very much rather be a high private in the rear rank and work, than to occupy an ornamental position of this kind. While I am not a speaker, I claim to be a worker, and I think this Section will be heard from in the next twelve months. I thank you, gentlemen.

MR. KILMER.—Gentlemen, as I came into the room I heard my name being mentioned, and afterwards I found out what it was for. I did not have time to refuse the office before I was taken by the arm and installed in it. I personally appreciate the honor, and on behalf of the State of New Jersey, which sent me here, I return my thanks. Anything that affects the varied interests of pharmacy I am deeply interested in. I am in pharmacy for two reasons; one is, I like the professional part, and I am also in for the bread and butter that I get out of it. As this Section affects that particular part which is pretty close to a man's heart, they say—his pocket—I shall try and do whatever the Chairman shall present for my performance.

The report of the Committee on the Rebate Plan being called for, Mr. Kilmer stated that through a misunderstanding as to the place where the evening session was to be held, the committee had been unable to meet.

On motion of Mr. Alexander, the Section adjourned, subject to the call of the Chairman, to hear the report of the committee.

SPECIAL SESSION—FRIDAY MORNING, JUNE 28TH.

The Section was called to order by the Chairman at 9 o'clock a. m.

Mr. Manning stated that the committee's report was in the hands of Mr. Kilmer, and that its purport was to virtually endorse the plan pro-

posed by French, Richards & Co., but that no names were given in the report.

On motion, the report was accepted.

The Chair completed the Committee on Commercial Interests by appointing as members Messrs. N. A. Kuhn, of Omaha, Neb.; J. W. Eckford, Aberdeen, Miss., and G. Mennen, Newark, N. J.

The Section then adjourned.

FRED. B. KILMER,
Secretary Section of Commercial Interests.

The report of the Committee, referred to above, is as follows:

It having been brought to the knowledge of the Section on Commercial Interests of the American Pharmaceutical Association that a class of dealers in proprietary goods known as advertising cutters use the benefits secured under the rebate system, of selling these goods to the detriment of legitimate pharmacists—

Resolved, That the Secretary of this Section be authorized to communicate with the National Wholesale Druggists' Association, and Association of Manufacturers and Proprietors, and ask their co-operation in such a modification of the rebate plan which shall prevent sales of proprietary goods in the Rebate System from being made to parties who advertise them at less than regular retail prices, or to any wholesaler who supplies goods of their manufacture to a retailer after due notice has been sent to the wholesalers that they should not sell to such a party.

This prohibition should be directed not only against parties who advertise below the regular retail rates, but also against parties who print circulars and price lists for distribution through the mails to consumers, at prices below the regular retail rates.

MINUTES

OF THE

SECTION ON SCIENTIFIC PAPERS.

FIRST SESSION.—WEDNESDAY MORNING, JUNE 26.

Immediately after the adjournment of the fifth general session of the Association, Chairman Emlen Painter called the Section on Scientific Papers to order—H. M. Whelpley, Secretary.

The Chairman read the following address:

Fellow Members of the Scientific Section American Pharmaceutical Association.

GENTLEMEN.—In the absence of any established order of business in this Section, I propose the following arrangement for our deliberations at this meeting.

FIRST SESSION OF THE SECTION (Fifth of the Association).

1st. The Chairman and Secretary assume their respective places.

2d. Reading of the Chairman's address.

3d. Report of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.

4th. Nominations (but not elections at this sitting) for the new Committee on Scientific Papers.

The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.

5th. Reading of Papers and discussions on the subjects brought up.

6th. Adjournment.

SECOND SESSION OF THE SECTION (Sixth of the Association).

1st. Reading of minutes of the previous session.

2d. Election of New Committee on Scientific Papers.

3d. Reports of Committees—Incidental business.

4th. Reading of Papers.

5th. Adjournment.

THIRD SESSION OF THE SECTION (Seventh of the Association).

1st. Reading of Minutes of the previous session.

2d. Reading of Papers.

3d. Installation of New Officers.

4th. Reports of Committees.

5th. New business.

6th. Reading of Minutes.

7th. Final adjournment.

The order and the transaction of the business of each Section being left by the Association to the Section itself, it seems to me appropriate and very desirable for this Section to establish a regular order of business, so as to more thoroughly systematize its work, and thus utilize the precious time allotted to it, to the very best advantage. I therefore recommend that a Committee be appointed to observe the working of the order of business we pursue at the several sessions, and to present, before the final adjournment of the Section, a regular order of business for its future guidance.

The adoption of such a report need not curtail, in any degree, the privileges of this Section, as delegated to it by the Association to make such rules as the Section itself may elect to do; and any rules we may adopt at this meeting, can be altered or amended, or changed throughout, as may appear desirable at any future time. In the absence on the part of the management, however, of any other pre-arranged or definite plan of procedure, to have an established order of business, will unquestionably greatly facilitate the work, and increase the interest of our members.

The wisdom on the part of the management of the Association, of two years ago in having divided its interests into these several Sections, is more and more manifest as time elapses: harmonizing the different interests represented, and enabling each department to calculate definitely upon having a proper hearing, and securing to each the uninterrupted use of its allotted time, and thus avoiding all possibility of one crowding out or encroaching upon the right of another. To no other Section, perchance, are the advantages of this change, so apparent as to this one, which so eminently leads in the way of progression, and in the elevation of the science and art of pharmacy to a higher plane. Indeed, the work of this Section may be properly looked upon as the culmination of the work of all the others, whose worthy accomplishments invariably lead to it.

Business interests, all important in themselves—as we could accomplish nothing without the means to do it—have for their object the benefit of ourselves alone: the educational interests have the laudable object in view of raising us to a higher standard, disseminating knowledge, and better fitting us for our life's work; and the legislative interest is still more comprehensive in its object, which primarily is the protection and benefit of the community, and incidentally a protection to those who are called upon to aid in protecting the health and welfare of the general public; but in all of these departments there appears to be at times such a diversity of interests, such conflicting views, that it remains for this one Section of the whole organization to bind us firmly together. There is no diversity of interests here, all striving toward the one object, with its highest aim above self, above Association, above country—to benefit mankind in general, irrespective of race, locality, condition or creed.

The Scientific Section, performing so important a part in the Association work, surely merits our best efforts in the cause of pharmacy, particularly now that we can give you the assurance that your contributions of literary work will be duly presented in open session, and opportunity given for free discussions.

Although this year the papers exceed in number the average for many years past, there is still room for many more, and I appeal to every member of this great National Association to contribute his quota—to contribute a small share at least toward making pharmacy merit the distinction and the right of being called a liberal profession. The work in this department is directly in that line, where self interest gives way to benefiting and elevating one's calling, which in turn still pales before the higher and grander aim of benefiting all, as the new light reveals fresh discoveries, and newly found truths are laid bare. Let us vie with one another in emulating the example of the illustrious Procter, one of the founders of this organization, and one of the greatest pharmacists the world has ever known.

I will not occupy more of thelimited time at our disposal, further than to make one

more suggestion. It is the duty of the Committee on Scientific Papers to submit a list of queries on suitable subjects for investigation. In my opinion these queries should emanate from different minds, and possibly from different localities; and I believe it would be a great assistance to the Chairman of this Section if a Committee were appointed to propose a certain number of queries (get them accepted if possible), and submit them to the Chairman within thirty days after adjournment of the annual meeting at which they were appointed. These lists of queries would furnish the Committee valuable material, as an aid in preparing the official list. EMLEN PAINTER, *Chairman.*

San Francisco, June 25, 1889.

Mr. Searby moved that the address be received and the recommendations adopted. Mr. Alexander moved as an amendment that the address be referred to a committee of three, to carry out the suggestions contained therein, and report at a later session. Mr. Searby accepted the amendment, and the motion thus amended was adopted.

The chair appointed Messrs. Searby, Hulting and Manning, the committee on the chairman's address.

Nominations for officers of the Section being called up, Mr. Ebert was nominated for chairman, but declined, and nominated Mr. H. M. Whelpley.

Mr. Kennedy nominated Mr. C. F. Dare for Secretary.

The nominations were then closed, to be reopened at a later session, when election will take place.

The reading of papers being called for, Mr. Calvert read the following paper by Mr. Patch, which was accepted and referred:

LABORATORY NOTES.

BY L. E. PATCH.

Much dissatisfaction has been expressed with the U. S. P. formula for solution of magnesium citrate. If made strictly according to the formula, after a time there is a copious precipitation of crystals. Examination of the crystals proves them to be $Mg_3 (C_6H_5O_7)_2, 10 H_2O$. This hints at an insufficiency of citric acid to produce the permanently soluble acid magnesium citrate.

In our text books and chemistries we have two formulas for magnesium carbonate, $3MgCO_3,Mg(OH)_2,3H_2O$ and $4MgCO_3,Mg(OH)_2, 5H_2O$.

Several samples examined for magnesium, as MgO and $Mg_2P_2O_7$, gave as a mean 24.8% of magnesium.

Several determinations of CO_2 gave 49.%.

This would give 69.44% of $MgCO_3$, 11.98% of $Mg (OH)_2$ and 18.58% H_2O, corresponding to the formula, $4MgCO_3,Mg(OH)_2,5H_2O$.

The reaction with citric acid would be as follows:

$$\begin{aligned} & 4\ Mg\ CO_3,Mg(OH)_2,\ 5H_2O\ (484), \\ & +\ 5H_3\ C_6\ H_5\ O_7,H_2\ O, \qquad (1050), \\ & =\ 5\ MgHC_6H_5O_7 + 16H_2O, + 4CO_2. \end{aligned}$$

Then the U. S. P. formula must have its magnesium carbonate reduced in quantity or its citric acid increased, as seen by the following equation :

484 magnesium carbonate is to 78 G. magnesium carbonate as 1050 of citric acid is to 170 G. of citric acid

The syrup of citric acid cannot supply the deficiency, as 480 G. of syrup contains 480 × .008 or 3.84 G. of citric acid, which is not quite enough to react with the potassium bicarbonate, as seen by the following reaction :

$$3KHCO_3, (300) + H_3C_6H_5O_7,H_2O, (210).$$
$$=K_3C_6H_5O_7,+ 4\ H_2O, + 3CO_2.$$

Then, 300 G. of bicarbonate is to 16 G. of bicarbonate as 210 G. of citric acid is to 11.2 G. of citric acid, and 11.2 G., less 3.84 G. in the syrup, would leave 7.36 G. deficiency.

This added to the 14 G. deficient on account of the magnesium carbonate, would leave 21.36 G. deficiency if the final reaction was to give acid citrate of magnesium.

This is not required to give a permanent solution, but we may allow the excess of bicarbonate to be decomposed by a portion of the acid citrate first formed.

For a permanent solution, dissolve 170 G. of citric acid in 800 G. of hot *distilled* water, add the 78 G. of magnesium carbonate through a sieve, stir until dissolved, add cold distilled water to make 1,000 G., add the 480 G. of syrup of citric acid, filter through a plaited filter, and wash with water to make the filtrate weigh 1,500 G.

Place 250 G. of this solution in each of six magnesium citrate bottles, previously fitted with wires and corks. Gently add, so as to float on top of the previous solution, without mixing, 80 G. of distilled water, and lastly, gently add 30 G. of a solution of bicarbonate of potassium, made by dissolving 16 G. of the bicarbonate in 150 G. of distilled water, filtering through a small filter and washing the filter with distilled water to make in all 180 G. of solution.

After adding the 30 G. of potassium bicarbonate solution, if need be, gently add distilled water to nearly fill the bottle, cork with smooth. firm, wetted corks, wire, shake, label and store the bottles, lying upon their sides in a cool place. Fifty lots so made have never crystallized, and invariably gave bright, permanent solutions.

MR. EBERT.—I would like to make a remark on the paper, without going into the chemistry and the equivalents of carbonate of magnesium and citric acid. I have had very little trouble in making this solution according to the pharmacopœial process; but it might be modified in this direction and made more practical. Instead of adding syrup of citric acid to the solution, why not add the equivalent quantity of citric acid contained in the syrup of citric acid at once to the magnesium carbonate? Then use simple syrup necessary to sweeten. The oil of lemon which most of us use for the pur-

pose of imparting the taste of lemon, should be well rubbed up with the carbonate of magnesium before it is made into the solution with the citric acid. That is the way I make the solution of citrate of magnesium, and I find no difficulty at all in keeping.

MR. CALVERT.—I will say a word about this much-discussed question of citrate of magnesium. What we want to do in getting up formulæ for our Pharmacopœia is to get at things as straight as possible, to have as little trouble as possible in making the preparation. Now, the plan for making citrate of magnesium as practiced on this coast is to take a certain quantity of carbonate of magnesium, break it up or rub it through a sieve, then take the quantity of citric acid required, put it into the pot, take the quantity of water required, put in some essence of lemon, and then add sugar direct; don't make any syrup or anything of the kind; those three ingredients are put into the pot all together; the water is put in, and the lemon; you let it stand until the effervescence has ceased, and you have then an acid magnesium citrate; you use a specific quantity of citric acid; you filter the solution, and all you have to do is to fill your bottles. We use mostly beer bottles in this country, because we are large consumers of that staple.

MR. MAIN.—Does a solution thus made keep for any length of time?

MR. CALVERT.—Yes, sir.

MR. MAISCH.—Do I understand Mr. Calvert to say that he uses the quantities of carbonate of magnesium and citric acid ordered by the Pharmacopœia?

MR. CALVERT.—I could not tell you that exactly.

MR. MAISCH.—The point made by this paper is that the quantity of citric acid is not sufficient for keeping the magnesium in solution. I have no experience with the formula of the Pharmacopœia of 1880, but it is the formula of 1870, I believe, unless I am very much mistaken. I have used that for a considerable length of time, and have not had the slightest difficulty. The object of the Pharmacopœia is simply to get the magnesia in solution and retain it in solution with the least possible quantity of citric acid. Instead of having a normal citrate, I think the Pharmacopœia aims at obtaining a two-thirds salt with a rather slight deficiency of citric acid. After the addition, subsequently, of the bicarbonate of potassium without loss of carbonic acid gas, the magnesium will remain in solution, for bicarbonates do not precipitate magnesium salts from their solution, but the carbonates do. I understood Mr. Ebert to say that he had no difficulty with the quantities of the present Pharmacopœia, which I think are essentially the same as contained in the Pharmacopœia of 1870, and with those I had not the slightest difficulty.

Mr. Ebert read the following paper in answer to query 39.

ARSENIC IN WALL-PAPER.

QUERY No. 39.—In what quantity and to what extent is arsenic present in wall-paper? Is the public health thereby in any degree affected?

BY D. H. GALLOWAY.

A large number of samples of wall-paper were obtained from many different sources, paper-hangers, stores, imported samples, and from friends, those from the latter being papers already upon their walls or about to be put on.

I made a determination of the arsenic in one hundred samples. These

samples were taken at random, and included all colors, styles, figures and prices, the latter ranging from four cents to $2 per roll, and some that were sold by the yard at a much higher price.

When I began this work, nearly a year ago, I supposed that, after a time, I would be able to tell by appearances whether a paper contained arsenic or not. This expectation has not, however, been realized, and I am now convinced that it is impossible to say, before examination, whether a given sample contains arsenic or not.

The following table gives the amount of arsenic, estimated as As_2O_3 in one square meter of each paper examined:

NUMBERS OF SAMPLES.	As_2O_3 in 1 sq. m.
3, 4, 5, 6, 15, 24, 29, 38, 44, 45, 46, 47, 48, 49, 50, 51, 52, 72, 75, 84, 89, 91, 92, 95, (24)	Free.
23, 28, 30, 37, 39, 42, 43, 57, 62, 69, 70, 71, 76, 78, 85, 86, 87, 88, 90, 93	Trace.
14, 25, 74, 83	1 mg.
73, 84	2 "
10, 33, 66, 67, 82	3 "
22, 63, 65, 99	4 "
54, 55. 59, 61, 96	5 "
13, 26, 32, 40, 53, 64, 68, 97	6 "
77	8 "
17, 18, 20, 21, 31, 34, 58, 98	10 "
36, 60, 79	12 "
11	14 "
7	15 "
41	20 "
1	25 "
26	26 "
15	30 "
2, 56	50 "
19	60 "
35	90 "
9, 81	200 "
100	600 "
27, 80, more than	100 "

Mr. T. N. Jamieson gave me several thousand samples that had been sold to pay duty at the custom-house. Twelve of these, picked out at random, showed arsenic in every case, ranging, however, quite low, from two to six mg. These samples were, presumably, of German manufacture. The uniformity of the amount of arsenic in these papers would seem to indicate that it had been used as an antiseptic in the paste with which the pigment was applied to the paper.

The two samples, 9 and 81, containing 200 mg. each, are probably of the same lot, as the colors are identical, though the figures are quite different.

No. 100 contains an average of about 600 mg. per square meter, the

arsenic being almost entirely in the red, a square meter of which, therefore, contains over one gram of arsenious oxide.

No. 56 looks like the same paper, although it contains only about 50 mg.; however, it is difficult to get a fair sample of a pattern containing figures so large and varied.

There is scarcely room for difference of opinion as to the injurious effects of large amounts of arsenic in wall-paper, upon those who are exposed to its influence. There is little doubt that the air in rooms papered with arsenical wall-paper becomes contaminated with arseniuretted hydrogen, particularly in damp weather. This gas is extremely poisonous, and, though in very small quantities, sometimes gives rise to most alarming symptoms.

Even if this decomposition did not take place, the air of the room must be filled with arsenic dust, particularly after sweeping and dusting, and thus cause more or less irritation of the eyes, nose, mouth and throat, similar to the symptoms of catarrh or a cold. Some of it is swallowed with the saliva, giving rise to intestinal and constitutional disturbances of a more or less serious character, as indigestion, nausea, diarrhœa, general debility, nervous prostration, etc.

Numbers of cases of fatal poisoning, in this manner, are on record, as well as many others, in which the cause was discovered in time, and on the removal of which the patients recovered. The extreme difficulty of tracing to their proper source symptoms of this character must be plain to every one. How frequently we hear the diagnosis "general debility," "nervous prostration," "indigestion," etc., the symptoms resisting all treatment until, perhaps, "rest and a change of air" are prescribed, when recovery follows, the symptoms returning, however, when the patient resumes his former work and environment. That many of these cases are due to arsenic in the wall-paper there is abundant proof; that there are thousands suffering from this cause, of which they and their physicians are totally ignorant, is a conclusion well warranted by the evidence.

Prof. Edward S. Wood gives (Report Mass. Board of Health, 1883), a list of forty-two cases of arsenical poisoning, most of which were due to wall-paper. Prof. Wood mentions a great many other articles in which arsenic has been found; among them are the following: Dress goods, muslins, linen, artificial flowers, curtains, lambrequins, gloves, calico, cloth, boot-linings, paper collars, linen collars (one collar contained 10.4 grs. of As_2O_3), hat linings, colored stockings, linings in baby carriages, bed hangings, colored wax candles, confectionery, etc., etc.

The presence of arsenic is so widespread that perhaps it would be impossible to exclude it entirely from such articles, but the deliberate use of it as a coloring for such purposes should not be tolerated. An attempt was made in Massachusetts a few years ago to secure the enactment of

laws on the subject, placing the limit of arsenic in wall-paper at 7 mg. to each square meter; but the wall-paper manufacturers were too influential with the legislators, and the bill failed to become a law.

There is no excuse for the presence of such quantities of arsenic in wall-paper, as all the colors produced by it can be made by other means, and in view of the helplessness of the average individual in the presence of such an insidious poison, its use as a pigment in all cases should be prohibited by stringent laws.

Chicago College of Pharmacy.

MR. MAISCH.—I am very glad that such a paper has been presented here, because I consider the subject one of the utmost importance. It has been investigated by chemists and others interested in public health perhaps for the last thirty or forty years, if not longer. I remember the time very well, perhaps some thirty years ago, when it was denied that the presence of arsenic in the coloring matter of wall papers could possibly have any injurious influence on the health of persons living in rooms where such paper was used, but careful experiments that were then made showed that arsenic is liberated, a volatile compound being formed, very likely arseniuretted hydrogen, which can be found in the atmosphere of rooms the walls of which are covered with arsenical paper. The amount of such arseniuretted hydrogen liberated is, of course, extremely minute, and it takes a long time for the wall papers to exert an injurious influence. The larger the quantity of arsenic contained in the coloring matter, of course the more rapidly will arseniuretted hydrogen be evolved and the more injurious will be the atmosphere. On the other hand, it must be remembered that arsenic can be detected in extremely minute quantities, and that in many cases it is very difficult to entirely free chemical compounds from the last traces of arsenic. Hence the importance of limiting the quantity of arsenic to be contained in a certain flat space of wall paper. Whatever influence our Association can bring upon the enactment of such laws as are indicated here, I think would be influence very well bestowed, and would in the course of time be appreciated by the public.

MR. WHELPLEY.—I do not know how much influence this Association could have upon legislation, prohibiting the use of arsenic in wall-paper, but there is one thing the members of this Association can do in furtherance of the object, and that is to examine wall-paper, and other substances that have been mentioned, for arsenic; not to wait for customers to bring them in to be examined, but to be enterprising enough to obtain samples for examination, and to report to their physicians and customers the result. In that way they will not only elevate the profession in the eyes of the public, but will be opening to themselves a new source of revenue; because if it once becomes known to the physician and the public that such dangers are among them, they will be willing to pay the druggists to determine whether these goods are dangerous or not. The medical journals of the present day report many cases of arsenic poisoning. I think that the druggist should not lose sight of this opportunity to benefit the public and at the same time promote the interests of his own profession. It is a singular fact that the manufacturers of wall-paper claim that there is no arsenic in wall-paper. I have seen circulars issued by wall-paper manufacturers to that effect. The manufacture of wall paper is one grand trust, and the price of wall-paper is maintained in a manner that is only equalled by the Standard Oil Combination and others of a similar charecter. They don't hesitate to spend any amount of money in issuing circulars and in publishing analyses to show that wall-paper does not contain arsenic: here is your opportunity to lay the difficulty bare before the public.

MR. EBERT.—In Europe, especially in Germany, this matter has been very much more carefully considered, and thought of as being of importance, than in this country. While studying in Munich we, as students, had the privilege of making such examinations in the laboratory of the Chemist for the Department of Health of that city. Wall-paper, beer, and various articles of food and drink, were constantly submitted, and this question of arsenic in wall paper, in clothing, feathers, ornaments, and other things, was constantly investigated.

Although the laws are very rigid, still quite frequently this contamination was found in samples purchased from stores in the city of Munich. They would be reported to the Health Department, and the goods were confiscated. I think if the Association would take some steps in that respect it would not be necessary to alarm the public, but laws could be enacted, and carried out under the supervision of local Boards of Health. I do hope that this matter may be deemed to be of importance enough, and that the gentleman be asked to continue his researches. Arsenic is contained in some of our foods: for instance, jellies are made out of glucose and are largely colored with aniline colors. You will find by testing these jellies that arsenic is present, whether in large quantities or not I don't know, but I know they are contaminated by aniline colors which contain arsenic.

MR. MANNING.—It needs something beyond the action of the State Board of Health to arouse the public to the danger. In our State, Massachusetts, the State Board of Health, as alluded to in this paper, has made a very full and complete report. The matter was carried to our legislature, and action was invariably sat down upon, from the fact that the community are not alive to the danger; they have no thought that there is any danger in this matter. In one city in our state the wife of a very prominent citizen died from arsenic poisoning, developed in the manner indicated, which was conclusively proved and believed by the community. In that connection I want to allude to what Prof. Whelpley has remarked, and that is the source of revenue that may be derived by the druggist. An analysis was made, and in less than thirty days the analyzer had a large number of analyses to make. But I don't believe the public generally will be moved in this matter unless some such thing as that develops that sentiment.

MR. HALLBERG.—I think the American Health Association would take hold of this subject, and I will move that the attention of the American Public Health Association be directed to this matter by sending to its Secretary a copy of the paper and discussion, and asking them to take such steps as might secure the proper legislation.

Mr. Hallberg's motion was seconded and adopted.

Mr. Manning read the following paper by Mr. Lloyd:

ON THE INFLUENCE OF HEAT AND MOISTURE UPON DRUGS.

QUERY 10.—What is the effect of Heat and Moisture as a preparatory step in the extraction of some drugs?

BY J. U. LLOYD.

In considering the natural condition of vegetable organisms, we find that recent plants present in one respect a marked variation from the same substances after drying. The inherent moisture amounts invariably to a large part of their bulk, and the greater proportion of this water is lost by drying.*

*I do not overlook the fact that they retain from five to fifteen per cent. of moisture when air-dried.

Aside, however, from the decomposition products and dissociations produced by desiccation, there is connected a feature that should perhaps not be overlooked, one that I believe to be of considerable importance in some instances.

The succulent vegetable structure, in its natural condition, is readily permeated by an appropriate alcoholic menstruum; the cell tissues being expanded in the fresh drug, these integuments are open to the free passage of liquids. Indeed, there seems to be a decided endosmotic affinity for an alcoholic menstruum, which, therefore, permeates readily the water-relaxed integuments, even if the plant substance is in great slices. This fact is readily shown by placing a few slices of any fresh plant in alcohol, and observing the result. If it be a colored drug like bloodroot, the act of extraction or displacement can be readily seen, and it is shown that the vegetable tissue is very quickly permeated through and through, providing the alcohol is not too concentrated. It requires but a short period to realize the fact that in the natural condition such vegetable structures are easily extracted by alcoholic liquids.*

Many of these vegetable substances in drying become hard, brittle and almost impenetrable to feasible menstruums. If the substance is excessively gummy or mucilaginous, alcohol may be then incapable of thoroughly extracting it, by reason of this pervading envelope of insoluble material, even though the desirable constituents of the drug are soluble in alcohol. Powdering the drug does not altogether obviate the difficulty, although it modifies it; and sometimes even a finely powdered drug of this nature is not capable of extraction with strong alcohol.

In my opinion, many tinctures and fluid extracts now made with mixtures of alcohol and water would be decidedly improved by the use of alcohol alone, were it capable of swelling and permeating the dried plant structure, thus reaching its inner recesses. Hence it is, that in order to satisfactorily extract a drug, we are often forced to bring the material into a condition bordering on that of the natural drug, and add water to the alcohol to form a suitable menstruum. Even though alcohol alone is the best solvent for the purified active constituents of some drugs, I therefore accept, as established in my experience, that to extract these same constituents from the drugs, a hydro-alcoholic menstruum is often desirable. Perhaps this feature of the art of extraction has not heretofore been presented in this light, nevertheless it is evident from my experience that

* In this connection I will remark that green drugs present an obstruction to percolation extraction, in the fact that the large amount of water present in their tissues dilutes a percolate, so that it is impossible to use ordinary maceration or percolation, and without much evaporation prepare a tincture that is representative of any considerable proportion of drug. There is another obstruction in the fact that if the alcohol is very strong it contracts the surfaces to a tough, leather-like substance which prevents rapid circulation of liquid.

there is no other object in using dilute alcohol in many cases, where it is certainly preferable to strong alcohol.*

Accepting, then, that water is often desirable as a simple *softener* of plant tissue, in order that the alcoholic menstruum may more easily permeate the substance of the plant material, the question arises, is it always best to previously mix the water with the menstruum?

My experience is to the effect that in many cases the operation of percolation is more thoroughly conducted by a deviation from the established methods. I have found it preferable with some drugs to use water sparingly, in a preliminary step, even if the constituent to be extracted from the drug is altogether resinous. My plan, under these conditions, is to moisten the powder by sprinkling it with a small amount of water, from two to three ounces of water to the pound of drug being an average. This moistened powder is then permitted to remain in a closed container for ten or twelve hours, and is then moistened again with alcohol, packed in the percolator in the usual manner, and extracted by the usual process. Where it is possible, after the water moistening and maceration, I prefer to use such an amount of alcohol to moisten the powder as will bring the combined amounts of alcohol and water in the drug to the strength of the alcohol that is used afterwards to continue the percolation.

For example: If a mixture of two parts of water and three parts of alcohol is to be used as the menstruum, I moisten the drug first with two parts of water; next, after the maceration period has passed, with three parts of alcohol; then, after packing the powder in the percolator, I continue the percolation with a mixture of the same strength, water two parts, alcohol three parts.

If a precipitate in the produced liquid is always objectionable, which I do not now admit, change in menstruum is not desirable.† If the experience others may make in this direction corroborates my own researches, it will be found that the art of plant extraction may, in many cases, be modified in this manner with great advantage.

I would summarize as follows: 1. Use, when desirable, enough water to soften the plant integuments before percolation, spraying the water on the powdered drug so as to avoid lumping.

2. Allow this water-moistened powder to stand in a closed vessel for a considerable period.

3. Where possible, before packing in the percolator, sprinkle it with

* The argument may be made that water is used on account of cheapness. This I do not admit in my own work, and I doubt if others consider it. The cost of the menstruum is not a factor with the manager of a laboratory.

† Upon the contrary, with some irregular preparations that I make, I aim to produce a copious precipitation of inert materials at certain stages of the operation, thus, by judicious manipulation, getting rid of burdens that fluid extracts carry, to their injury.

enough alcohol to bring the liquids to the composition of the menstruum subsequently employed in percolation.

Among the advantages that may be derived from this process, when feasible, is the fact that a coarsely powdered drug may be more easily exhausted than by the usual method.

The part of the query relating to the use of heat as a preliminary step, I will try and consider at a future day.

MR. SEARBY.—The paper opens up to our minds facts with which we are probably familiar, but still have not always thought of as much as we ought to have done, and that is, that a dried drug is not the same thing as the drug was before it was dried. If you take the case of dandelion root, the taste and appearance indicate that a great change takes place in the simplest and most careful method of drying that can be adopted. The fresh dandelion is much more bitter than the dried root; as it comes to us in the market it is generally altogether too sweet; some change has taken place in it, whereby to a large extent, I presume, judging from physical properties, it has been injured; and I doubt not the same thing occurs with a great many vegetable substances. We should, if possible, find some means by which the original properties of drugs can be preserved. This would be a step in the direction of uniformity in our galenical preparations. This matter is evidently one of great difficulty, but the paper before us throws some light on the matter and leads us to believe that we may arrive at methods by which this may be accomplished. I look upon the paper as one of great importance, as a very practical one, and as one which we may well look into and experiment upon further in our own way.

MR. MAISCH.—Prof. Searby has called attention to the fact that changes take place in the drying of dandelion and other drugs. The investigations which are needed are to determine in what the changes really consist, whether the active principles are really altered to any considerable extent. I believe that the example quoted by Prof. Searby, dandelion, is scarcely a good one, at least in a majority of cases. Dandelion collected at the different seasons of the year has an entirely different taste, even in the green state. Thus, for instance, when collected late in the autumn it is very bitter, while collected in the spring it is more sweet and less bitter, or rather the bitterness is covered by the presence of sugar, which is not present in the fall root, or not in the same proportion. Now, to what extent drugs or parts of plants in drying have their active principles changed, is the question which I believe in the majority of cases has not yet been determined. In certain cases, for instance in frangula bark, a change is known to take place. But whether the alkaloids are altered to any considerable extent, we do not know. The changes in color on drying have been noticed at a very early date, and they have always been attributed to some principle which is not of great importance as a medicinal agent, but may perhaps be of considerable physiological importance for the development of the plant. The paper by Mr. Lloyd is certainly a very interesting one. I recognize, however, the fact that it is extremely difficult to generalize matters in answer to this question, because an article which, for instance, contains a large amount of mucilaginous matter will behave differently towards alcohol than a plant organ which does not contain any mucilage or gum, but contains in place thereof a considerable amount of resin; and thus it seems to me that even in these cases it becomes necessary to examine each individual plant or each individual drug in order to determine the precise manner in which it should be treated. That is in reality indicated in the paper, but no examples are given. It opens up a field for investigation, which is a very extensive one undoubtedly.

MR. WHELPLEY.—I know that it is a common popular opinion that we should use drugs in as near the fresh condition as possible. Now, is it not possible that these drugs during the process of drying form new medicinal products that are even of greater value than the drugs themselves? It is well known that many products of organic decomposition are very active, and we have to deal with them in toxicology. Now, is it not possible that some of our drugs owe their medicinal qualities to substances that are formed during the process of drying and by changes that take place when they are kept on hand? Of course, when we examine a drug for its structure, as in microscopy, we desire to have the fresh substance.

MR. RAY.—The true test is in the physician's use, and I know that in many cases what we call the common people get effects from certain drugs that we don't get. There certainly are considerable changes produced in the drying of drugs, and if they remain long in the drug store a great many more changes that should not occur; but when we assume that by getting certain compounds from the drug we have exhausted its medicinal properties, I don't think we are right. Some of those drugs which are thought to possess no medicinal properties whatever are used by the common people, and they say they get good results from them, and also certain physicians claim they get results from drugs that others say they cannot get from them. In the matter of drying drugs it would not be possible to get all of them in a fresh state. I have found that something I heard years ago in a lecture is nearly true, that very hot water, or hot water under pressure, is an almost universal solvent; and I have found it to be true to a considerable extent that hot water under pressure by which you can increase its heat to any extent—even, I have read somewhere, make it so hot that steam will burn wood—is an excellent solvent. I think that some members if they undertake the experiment will find they can do a good deal more in that way than they can in some other ways. I have a piece of apparatus at home now which was constructed just before I came down, and the work that I can do with it was before rather puzzling to myself at times. It works to 180 pounds pressure, and I could not go any further than that because I was afraid it might blow up. I had it tested to that before I started in. It greatly simplifies the extraction of some drugs, and enables me to do the work in a day that formerly occupied a week perhaps. I could not detect taste or smell in the marc, and I could not detect any perceptible effect from it. Let some of the members undertake, or perhaps I will undertake, to investigate this subject during the next year, if it is not already pre empted by Prof. Lloyd, and submit some results.

THE CHAIRMAN.—I am sure the Committee on Scientific Subjects would be glad to receive a communication from Mr. Ray, and that there is no objection to his investigating the subject.

MR. HALLBERG.—This is a very large subject, and when we have solved it, we will have passed the Rubicon in pharmaceutical practice. It involves the production, the liberation, and the subsequent extraction of active principles of drugs. Where we are at sea now is that we don't know where to start. We don't know what or where a good many of the active principles are. Prof. Maisch said that many of the alkaloids were pretty well known: that is true. But we don't know their relationship, and we don't know what most principles are. Take for example hamamelis—you distil it with water, and get a distillate, but don't know what it contains. It has been reported that the active principle of hamamelis is tannin alone, but there is no tannin in the distillate, though this contains some active principle.

I have for many years held, though I have been unable to prove it, that most of these drugs are analogous to wild cherry bark, and that when moistened with water certain

substances react on each other and form new compounds. In wild cherry bark and in bitter almond we have recognized that simply from the fact that the new compounds produced make their presence known by the peculiar odor; but suppose the new compounds do not develop a peculiar odor—like ergot, which merely develops a faint odor of trimethylamine. Now, I am satisfied that when ergot comes in, macerated with water for some time, there are active principles produced, new compounds are formed, and they are extracted by the water. We can clearly prove that, because ergot, until acted upon by water, is of no activity medicinally. There is one practical point about Prof. Lloyd's paper, which has direct bearing at the present time upon pharmacopœial relations. In a number of the tinctures of resinous drugs, like valerian, the menstruum was reduced from strong alcohol to about seventy or seventy-five per cent. It has been a mystery to a great many druggists why that was done. The Committee recognized this very principle. Now, it is said by Prof. Lloyd that it is necessary to have the drug brought back as near as possible to its original condition, to swell the cell walls, in order to establish osmosis by the menstruum, and thus liberate the active principle. I think it was a great step forward to reduce the alcoholic strength of the menstruum for resinous drugs; it exhausts better, and it yields a better preparation. I think that the effect of the paper in this direction should not be lost sight of.

MR. SEARBY.—The main question raised by Prof. Lloyd is in regard to the texture of the tissues, which he seeks to bring back to their normal condition.

MR. CALVERT.—Does Mr. Hallberg consider that fresh powdered ergot has no effect until it has been steeped in water?

MR. HALLBERG.—None.

MR. CALVERT.—When taken into the stomach it has no effect?

MR. HALLBERG.—It gets in water then.

MR. CALVERT.—There is another part of the subject. It seems to me there is somewhat of a tendency to go back to coarser powders and older methods. For my part, I think the Pharmacopœia has made a great mistake in ordering powders in a very fine condition, especially for percolation. It is a great deal of trouble, and I don't believe that many druggists use the powders as fine as they are ordered by the Pharmacopœia, and if they do, I consider that they do so simply because they are ordered to do so, and not because their common sense tells them to do it.

MR. RAY.—I don't think you can grind the powder fine enough, but that the menstruum can be put through it as often as you want to.

Mr. Stevens read the following paper, which was accepted and referred:

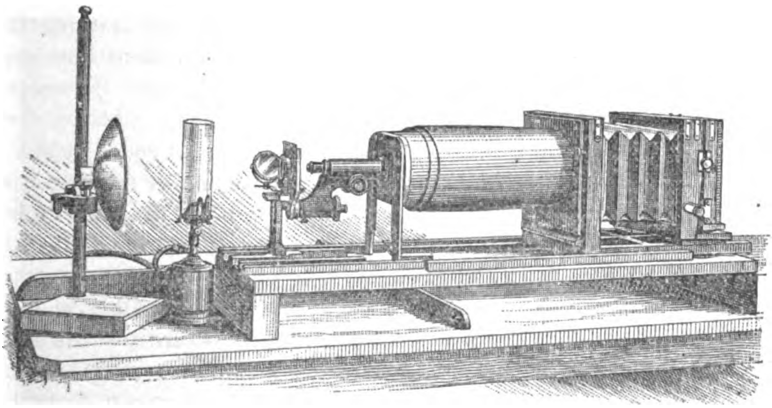
PHOTO-MICROGRAPHY.

BY W. H. KRUG AND A. B. STEVENS.
School of Pharmacy of University of Michigan.

Photography is fast becoming popular as a source of amusement. The tourist of to-day is often a hunter, though not a hunter of deer and buffalo alone. He is a hunter of views on sea and shore, and as he travels from spot to spot, shoots now a bit of landscape, now a view of old ocean or an amusing group of figures, as fact and fancy dictate. In the seclusion of his dark room, with the aid of a few chemicals, he brings forth as noise-

lessly as a spirit from the night, the sharp, forceful picture, with which to refresh his memory, that he may live over again the delight of his tourist days.

While keenly appreciating all the delights and benefits of out-door photography, there is for the chemist and pharmacist a photographic field still more fruitful of results, and not less delightful and instructive. It is the field of photo-micrography, or the photographing of microscopic objects. There is scarcely a microscopic object whose every detail cannot, with the camera's aid, be reproduced upon paper. For the chemist there are beautiful crystals of the various alkaloids, glucosides, organic acids, sections of the roots, stems, seeds, leaves, etc., of plants. It is to this branch of photography that our attention has been especially directed.



Apparatus for Photo-micrography.

The apparatus used has been of a kind simple and easily constructed, consisting of a microscope with a tilting stand. The tube of the microscope was placed in a horizontal position. The eye-piece was removed from the microscope, and the front board from the camera. The microscope and camera were then connected by means of twotu bes, each five inches in diameter and twelve inches long, made of tarred paper ; one of the tubes was made smaller than the other that it might slide freely in the larger tube, in order that the distance between the microscope and the camera might be lengthened or shortened at pleasure. To use the apparatus, the object is placed in the microscope and the reflector removed. The light used was an Argand burner, placed about six inches from the stand, and a common reflector placed a few inches in the rear. The light passed directly through the object, and through the objective, throwing the image upon the ground glass of the camera.

The size of the image is increased or decreased by lengthening or shortening the camera. The image should be focused upon the ground glass by turning the coarse or fine adjustment of the microscope. When the

image was as good as could be obtained upon the ground glass, we found that it could be very much improved by focusing upon a piece of plain glass with an Anthony focusing glass.

The apparatus thus far may be cheap or home-made, but the objectives must be first-class, and entirely free from spherical aberrations; otherwise it is impossible to get all the parts of the image in sharp focus at the same time. The objectives required for the photographing of sections of plants vary from one-fourth to three inches. The eye-piece may be used in some cases, but better results are obtained without.

Photographs were taken under uniform conditions of the same root. 1" without stain, 2" with eosine stain, 3" stained with methyl blue, 4" stained with nitrate of silver. The best results were obtained from the unstained section. The plates used were the Eastman Am. Film, and numerous trial exposures were made, the time of exposure varying from from five to sixty seconds. The best results were obtained from exposures varying from ten to twenty seconds, depending upon the enlargement, and the thickness and color of the section.

Hydro quinone and pyro-developers were used with equally good results. The entire negative, except the space occupied by the image, was côvered with Brunswick black, which caused the print to stand in bold relief against a clear, white background. The prints were made upon Eastman's bromide paper, letter A.

We are indebted to Mr. A. W. Burwell, of Cleveland, Ohio, and Mr. J. E. Alworth, of the School of Pharmacy of the University of Michigan, for the microscopic sections used for this work.

MR. MAISCH.—I don't claim to have much experience in this line of work, but as far as my limited experience goes, I have had the best results also with unstained sections. I think Prof. Whelpley has done a great deal of work in that line.

MR. WHELPLEY.—I desire to say a word in regard to staining, and that is that the best results that I have ever seen from any staining were had with Arnold's staining fluid —ordinary ink. One reason why we got such diverging results from different stainings is that the sections are not the same, and it is frequently the result of the condition of the specimen more than it is of the stain itself. I have had good results from Arnold's writing fluid with good sections, and poor results from poor sections, and the same comparatively from other stains, but of all the stains that I have ever used I think that Arnold's writing fluid has stood at the head as bringing out the photograph like a wood cut.

Mr. Calvert read the following paper, which was accepted and referred:

THE PHARMACOPŒIAL NOMENCLATURE.

BY OSCAR OLDBERG, P. D.
Prof. of Pharmacy in the Illinois College of Pharmacy, Chicago.

In a paper on this subject, which it was my privilege to read before this body at the Saratoga meeting, in 1880, prior to the sixth revision of

our Pharmacopœia, certain propositions and recommendations were submitted which again become pertinent and timely upon the eve of the next revision. For the full text of the paper, I refer to the Proceedings of the American Pharmaceutical Association for the year named.

Upon the courteous invitation of the chairman of the Section on Scientific Papers, I present at this meeting a review of this important subject which once more claims our attention.

In my paper of nine years ago, it was sought to state the reasons why a scientific, technical nomenclature must of necessity be made up of words borrowed or formed from the vocabularies of dead languages, and arbitrarily assigned whatever meaning we may desire them to convey. Every term used in scientific nomenclature must convey not only a *correct* idea, but as *full* an understanding as possible of the thing, force, or condition it refers to, and must retain that meaning *unchanged* until by common consent its meaning is modified in a specific way. We may not be able in a single instance to find or construct such a term as will fulfil these requirements perfectly, but we can approach their fulfillment more and more as we advance in knowledge. Not only must everything which has already become a part of our knowledge be correctly named or expressed, but every new fact or new knowledge, every proper differentiation which new knowledge renders necessary, must be accurately expressed by new terms.

A very distinguished and learned physician of my acquaintance once said: "New names add nothing to knowledge." He, no doubt, meant that to change the names of things simply for the sake of change, or for any reason save that of correctness or greater clearness, adds nothing to knowledge. I would go further than that; I would venture the assertion that any new name which will not convey a clearer or more specific idea than the old name which it is intended to replace, is a positive evil. If the new name is not an improvement upon the old, it hinders the growth of knowledge, as the exchange of a lame horse for another equally lame simply delays the journey. But, surely, such new names, new words, and new expressions as do represent correctly, clearly and fully new ideas, new things or new knowledge, are absolutely necessary, if we are to make any progress at all.

Every new thing discovered, and every new idea or invention, must have a new name, because the new thing or invention can be made known to others only through their physical senses. But that is not all. As knowledge increases we learn that many old names are unsuitable, insufficient, ambiguous or false, and that such old names must either be entirely discarded, or given a new or a more limited meaning, or must be changed in form so as to become in fact new names. We often find that the old names and expressions, which remain unchanged while the ideas they once represented have changed or passed away, are so at vari-

ance with new or increased knowledge that they become real stumbling blocks.

Again, the growth of science and art brings with it new classification, new orders, new genera, new species. As the tree of knowledge grows, it is not its trunk and main branches only that increase; it sends forth new branches, branchlets, twigs, leaves, blossoms and fruit.

For the convenience of those who will consider the subject carefully, and who might wish to refer to the propositions presented in my former paper, if relieved of the trouble of looking it up in the Proceedings of the Association, I will here repeat them. They are as follows:

1. No name used should be one that does violence to established knowledge or perpetuates error.

2. Each name should be clear and descriptive as far as consistent with necessary brevity.

3. No name should be used which is capable of essentially different interpretations, or which has been, or is, applied to more than one thing.

4. The nomenclature should be one which enables us to combine, to the greatest practicable extent, alphabetical order with systematic classification, and to that end the generic should precede the specific (in all titles of more than one word) as logic demands of every scientific definition.

5. Harmony with the rest of the civilized world is desirable, so far as attainable without sacrifice of clearness and correctness, and without too far-reaching or radical changes.

To these propositions I desire now to add another:

6. Each generic title used to designate a group of substances or preparations should be one capable of an intelligent brief definition, which correctly applies to every individual member of the group of substances, to which that generic title is given.

The United States Pharmacopœia of 1882 makes the following reference to the nomenclature:

"The nomenclature has been revised on the basis of certain general principles which may be briefly stated as follows:

"1. The officinal Latin title of a vegetable drug is to be the botanical genus name. A few titles were excepted from this rule, being those of old and well-known drugs, as: *Belladonna*, *Frangula*, *Ipecacuanha*, *Pulsatilla*, *Senna*, *Stramonium*, etc.

"2. The officinal Latin title, selected according to the preceding rule, is to denote, or stand for, the *part* of the plant directed to be used, provided only *one* part of the plant is officinal. Examples: *Aconitum*, to stand for Aconite Root; *Conium*, for Conium Seed [sic]; *Hyoscyamus*, for Hyoscyamus Leaves, etc. But if more than *one* part is in use [sic], the part is to be specially mentioned in the title. Examples: *Belladonnæ Folia*; *Belladonnæ Radix*; *Stramonii Folia*; *Stramonii Semen*.

"3. The officinal English titles are to be the scientific, botanical (genus or species) names, rather than the vernacular names; except in the case of those drugs, where the vernacular names are derived from, and still almost identical with, the scientific names, or where long custom has sanctioned some other name.

"4. The titles of compound medicines are to express their composition, or indicate their constituents, rather than their properties. In a few instances this rule is departed from, as it was deemed unwise to alter the titles of several well-known compounds, *e. g.*, *Collodium Flexile*, *Pilulæ Catharticæ Compositæ.*

"5. The Latin names of alkaloids have been made to terminate in *-ina*, and the corresponding English names in *-ine;* the latter termination being at present preferred, in modern chemical language, to the termination *-ia.* The so-called neutral principles have received the termination *-inum;* English *-in.* Examples: (*Alkaloids*) Morphina, Morphine; Quinina, Quinine. (*Neutral Principles*) Picrotoxinum, Picrotoxin; Santoninum, Santonin.

"6. The gender of the Latin nouns of salts in *-as* and *-is* has been changed back to the masculine gender, it having been shown that the alteration to the feminine gender, made in the Revision of 1860, was based on error.

"7. A number of special alterations in nomenclature are made, for reasons carefully considered in every case. Examples: *Alumen* to denote the Sulphate of Aluminium and Potassium, instead of the Sulphate of Aluminium and Ammonium; *Chirata, Asafœtida, Cambogia*, for Chiretta, Assafœtida, Gambogia; *Lupulinum, Glycerinum, Pyroxylinum*, for Lupulina, Glycerina, Pyroxylon; *Massa*, for Pilula (in the sense of "pill-mass"); *Sulphidum*, for Sulphuretum; *Manganum*, for Manganesium; *Bromum, Chlorum* and *Iodum* for Brominium, Chlorinium and Iodinium, etc.

"8. In the typographical arrangement and spelling of systematic botanical terms, the rules of the International Botanical Congress (Paris, 1867) are adopted, so far as they can be applied. * * "

In regard to synonyms the Pharmacopœial Convention of 1880 ordered that "The different headings shall be accompanied in a manner not interfering with the perspicuity of the text of the formulæ, by a list of synonyms in common use."

The preface to the Pharmacopœia says: "Of synonyms, it was not deemed expedient to introduce a promiscuous list either in the text of the work or in the index. Common and well-known synonyms, however, such as are generally used in commercial or technical language, have been admitted."

We will now briefly review these rules of the Pharmacopœial Revision Committee.

Rule 1 is so self-evident that it will, no doubt, remain in force.

Rule 2 is not, in the judgment of many pharmacists, a good one. It is not sufficiently explicit or safe to make the title *Aconitum* "stand for" Aconite Root, and the title *Conium* for Conium Fruit, because "more than *one* part is in use" of these plants. Besides there are so many plants, of which several different organs are separately used as drugs, although not mentioned in the Pharmacopœia, that it would be well for the sake of uniformity to designate in the titles the particular part or parts used, as is done in the German and Swedish Pharmacopœias, and to a great extent in the British Pharmacopœia. Such titles as Aconiti Radix, Conii Fructus, Digitalis Folia, Colchici Semen, and Frangulæ Cortex, are more explicit and not too long. But if we construct and adopt systematic technical titles without Latinic form, and use the Latinic titles as definition titles rather than for common use, there will be no necessity of carrying out the same rule in reference to the common titles in cases where there is no danger of ambiguity. Thus, while I would regard the name "Frangula" as a sufficient common title, I would, nevertheless, make its Latinic or definition title "Frangulæ Cortex."

Rule 3 is a good one, likely to stand.

Rule 4 is also one that must meet with general approval, but it would be improved by qualifying it so as to require only that no title shall be constructed to express the *therapeutic* properties or uses of the substances. But it is difficult to understand why "it was deemed unwise to alter" the title of *Pilulæ Catharticæ Compositæ*, in accordance with the rule, to some such title as Pilulæ Colocynthidis Compositæ, or Pilulæ Colocynthidis Mercuriales, if we want to retain such a compound in the Pharmacopœia at all.

Rule 5 has been carried out with good results.

The correctness of Rule 6 is still subject to controversy, but it would be unfortunate to open the discussion again. Some pharmacopœias treat such nouns as *nitras* and *sulphis* as if they were masculine; others treat them as if they were feminine. Inasmuch as these titles or terms are not Latin nouns at all, but simply technical titles constructed from words derived from different languages, and arbitrarily given a Latinic form, why should we hesitate to adopt whatever gender we please for them? Let them stand as masculine.

This brings us to the consideration of the real origin of our technical, chemical and pharmaceutical titles. It is incorrect to say that we have Latin titles in the Pharmacopœia. A little analysis will reveal a Babylonic confusion of tongues in the chemical and pharmaceutical nomenclature.

Greek words furnish the titles: Rhizoma, gummi, resina, saccharum, æther, glycerinum, charta, emplastrum, cataplasma, trochiscus; and absinthium, aconitum, agaricus, althæa, amygdala, amylum, cardamomum,

carum, caryophyllus, anthemis, chamomilla, chondrus, cinnamomum, colchicum, colocynthis, conium, crocus, elaterium, galbanum, glycyrrhiza, helleborus, hyoscyamus, indigo, nitrum, opium, mentha, olibanum, piper, scammonium, scilla, sinapis, spermaceti, tartarus, tragacantha, zingiber, atropina, codeina, morphina, strychnina, ammonium, argentum, cadmium, calçium, barium, iodum, bromum, chlorum, arsenicum, lithium, chromium, hydrargyrum, oxygenium, hydrogenium, nitrogenium, phosphorus stibium, oxidum, chloridum, bromidum, iodidum, chloras, arsenis, hydras, phosphas, etc.

Latin words furnish the titles: Radix, cortex, lignum, herba, folia, flores, fructus, semina, oleum; species, pulvis, trituratio, massa, pilula, confectio, aqua, liquor, mucilago, infusum, decoctum, spiritus, tinctura, acetum, vinum, syrupus, mistura, emulsio, succus, extractum, linimentum, unguentum, ceratum, sapo, suppositoria, acidum, aluminium, aurum, ferrum, carbo, aurantium, digitalis, lavandula, nux vomica, ricinus, serpentaria, stramonium, valeriana. "Sulphur" is of Latin and Greek origin.

Arabic words furnish the titles: Acacia, alcohol, boron, borax, berberis, kalium, taraxacum.

South American words give us the titles: Copaiba, cinchona, ipecacuanha, jaborandi, ratanhia, tolu, etc.

Miscellaneous: The names bismuthum, niccolum, cobaltum and zincum are of German origin.

Potassium is an especially instructive example of Latin nomenclature, being derived from the English words, "pot" and "ash." Sodium is also a word of English origin.

The words stannum and tin are derived from the old English or Saxon words "stan" or "staen."

The metal strontium is named after a village in Argyleshire.

Platinum, belladonna, sarsaparilla, vanilla, and cascarilla are Spanish words.

"Ergot" is a title of French origin; gelsemium from an Italian word; jalapa from Mexican; manna and myrrha, Hebrew; camphora, Chinese; catechu, Japanese; cusso, Abyssinian; buchu, Hottentot; senna, Senaar; cambogia, Cambogian; benzoe, Siamese; kino, Malabar; cajuput, Moluccan; calumba, Mozambique; quassia, Surinamese; tamarindus, East Indian; guaiacum, West Indian; senega is named after the Seneca Indians of North America; cuprum after the island of Cyprus; magnesia after a town in Asia Minor; gentiana, after King Gentius of Illyria; krameria, after Herr Kramer; and nicotiana, after Monsieur Jean Nicot.

In the Swedish Pharmacopœia there is the title "Amylum Arrow," and in the French Codex we find "Emulsio de Coal Tar;" but the words "arrow" and "coal tar" are really not Latin, however strongly it may be insisted upon that the Latinic titles of the Pharmacopœias con-

stitute Latin, and require a knowledge of the Latin language to be intelligible; for the words "arrow" and "coal tar" seem to be intelligible to many who have not the slightest knowledge whatever of Latin.

Indeed, the writer, who spent much time learning a little Latin, which has *not* been wholly useless to him, hopes and prays that the time will soon come when we shall take such a sensible view of scientific technical terminology and nomenclature, that it shall not be deemed necessary to learn a dead language in order to be able to use them. It would be interesting to know how large a proportion of the botanists, chemists, physicians and pharmacists really know Latin; and also to know whether or not there be a greater number of good botanists, chemists, physicians and pharmacists among those who are Latin scholars, than among those who are not. To use a pharmaceutical nomenclature which requires every druggist or doctor to spend a couple of years' study on Latin, is like putting the entrance to your house on top of the roof. But, fortunately, it is *not* necessary to know Latin in order to use a technical pharmaceutical nomenclature intelligently, any more than it is necessary to put a five-hundred-dollar harness on a fifty-dollar horse, if we only choose to emancipate ourselves from the antiquated and senseless idea that such a nomenclature must have a Latin form, subject to the rules of Latin grammar.

In the paper read before this Association in 1880, it was proposed that all the Latinic titles should be treated as indeclinable nouns, and that the genitive, wherever hitherto used in such titles, be abolished. This, I am still fully persuaded, would have been a useful and sensible reform. We already have a great many indeclinable technical terms used in chemical and pharmaceutical nomenclature. But I am now convinced that the principal technical names used as official titles should not even have a Latinic form. What we need is a perfect scientific nomenclature, such as described in the beginning of this paper, constructed of names formed in great part from words selected from languages no longer subject to change, and such a nomenclature need not be encumbered and spoiled by Latin forms and declensions at all.

Many who are indeed Latin scholars, many who frankly disavow all knowledge of Latin, and many learned physicians who are faithful and valuable workers and acknowledged leaders in medical science, and especially in pharmacology, have expressed the same or similar views.

It is proposed, therefore—

1. That the official pharmacopœial titles shall consist of such terms only as may be properly used in scientific language, and shall be English in form so far as consistent with their origin and technical character.

An intelligent and fair application of this principle would, of course, exclude such titles as foxglove, squirting cucumber, male fern, logwood, henbane, etc., but would admit of the use of such titles as water, wax, starch, etc.

2. That in addition to the official titles referred to in the preceding proposition, there shall be given in the Pharmacopœia such explicit Latinic titles as will constitute definitions of the English titles so far as consistent with necessary brevity.

Such a reform as this would be a grand step forward in pharmaceutical nomenclature, and would aid greatly in accelerating the progress of our art. It would require no changes such as would not be at once fully understood and welcomed, and those who attach great importance and value to the Latinic form ought to be willing that the Latinic titles shall take a subordinate position in the text of the Pharmacopœia, as they have already taken a subordinate position in speaking and writing, especially if, as here proposed, they be hereafter invested with a new significance, as definition titles. That kind of Latin which has been formed during the centuries expressly for purposes of scientific terminology, is no doubt of value as the universal language by which different nations might define or fix the meaning of more convenient and natural technical terms, so that they may be everywhere understood; but it is not necessary that Latinic titles should take precedence over the titles actually used in literature and oral intercourse.

In France there has been, for reasons which have nothing directly to do with science, an unfortunate radical departure from the rule that a systematic scientific nomenclature is necessary in chemistry and pharmacy, as well as in other branches of scientific knowledge, observation and reasoning. The French Pharmacopœia not only gives a subordinate position to such Latinic titles as it has retained, but such Latinic titles as it has are unsystematic. In France, also, physicians' prescriptions are written in the vernacular. Such a deplorable condition of things would probably never have been brought about if there had been a French scientific, technical, chemical and pharmaceutical nomenclature, made up of terms formed from words derived from unspoken languages. But there was no other scientific technical nomenclature in French materia medica and pharmacy to take the place of the Latinic terms.

If we should conclude to use clean and clear systematic English titles as the official titles of our Pharmacopœia, and to use the Latinic titles simply as definition titles, this change would, of couse, not interfere in the least with the use of the Latinic titles in writing prescriptions, if these titles should be preferred for that purpose.

Let us now illustrate the changes which would result in our Pharmacopœia in case these two propositions should be adopted by the Pharmacopœial Convention, or the next Revision Committee.

Instead of writing:	We would write:
ACIDUM BENZOICUM.	BENZOIC ACID.
BENZOIC ACID.	ACIDUM BENZOICUM.

ACONITUM. ACONITE.	ACONITE ROOT. ACONITI RADIX.
ALLIUM. GARLIC.	ALLIUM. ALLII BULBUS.
ALTHÆA. ALTHÆA.	ALTHÆA ROOT. ALTHÆÆ RADIX.
ALUMINII HYDRAS. HYDRATE OF ALUMINIUM.	ALUMINIUM HYDRATE. ALUMINII HYDRAS.
AMYLUM. STARCH.	WHEAT STARCH. AMYLUM TRITICI.
ANTHEMIS. ANTHEMIS.	ANTHEMIS. ANTHEMIDIS FLORES.
AQUA. WATER.	WATER. AQUA.
AQUA ANISI. ANISE WATER.	ANISE WATER. ANISI AQUA.
ARGENTI NITRAS. NITRATE OF SILVER.	SILVER NITRATE. ARGENTI NITRAS.
BELLADONNÆ FOLIA. BELLADONNA LEAVES.	BELLADONNA LEAVES. BELLADONNÆ FOLIA.
CAPSICUM. CAPSICUM.	CAPSICUM. CAPSICI FRUCTUS.
CATECHU. CATECHU.	CATECHU. CATECHU LIGNI EXTRACTUM.
CORNUS. CORNUS.	CORNUS. CORNUS RADICIS CORTEX.
POTASSII ACETAS. ACETATE OF POTASSIUM.	POTASSIUM ACETATE. POTASSII ACETAS.
RESINA SCAMMONII. RESIN OF SCAMMONY.	SCAMMONY RESIN. SCAMMONII RESINA.
TINCTURA GELSEMII. TINCTURE OF GELSEMIUM.	GELSEMIUM TINCTURE. GELSEMII TINCTURA.
FERRI CHLORIDUM. CHLORIDE OF IRON.	FERRIC CHLORIDE. FERRICUM CHLORIDUM.
FERRI SULPHAS. SULPHATE OF IRON.	FERROUS SULPHATE. FERROSUS SULPHAS.

With regard to the Latinic titles given in the present American and British Pharmacopœias, it is evident that there is room for improvement. Thus the British Pharmacopœia is guilty of such inconsistencies as these: In the following official titles the plant part used is not named, *viz.*, in

cubeba, tamarindus, gelsemium, ipecacuanha, jalapa, filix mas, zingiber, senna, crocus, myristica, etc., while without any apparent reason not equally applicable in the preceding cases, the plant part used is designated in anisi fructus, papaveris capsulæ, armoraciæ radix, rhei radix, colchici cormus, podophylli rhizoma, valerianæ rhizoma, buchu folia, scoparii cacumina, cardamomi semina, etc.

There are other inconsistencies to be found in the British and the United States Pharmacopœias; but I have been unable for want of time to refer to them in this paper. I hope, however, to present to the Pharmacopœial Convention such comments as occur to me in this direction.

American pharmacists may well be proud of their Pharmacopœia; but true pride in anything we have should prompt us to improve it more and more. All reforms and improvements of lasting value progress by degrees; but they will never cease.

The following paper, read by Mr. Hallberg, was accepted and referred:

ON WOOL-FAT OR LANOLEUM.

An investigation concerning its preparation, with some historical references.

BY C. S. HALLBERG.

The introduction of the petroleum product, soft paraffin, marked a new era in dermic medication. The discovery of a neutral body of convenient unctuous consistence, indifferent to changes of atmosphere or temperature, not acted upon by chemical agents, was regarded as a very valuable addition to the materia medica. It rendered possible the preparation of ointments not amenable to the rectionary changes which had always been regarded as the *bete noir* of pharmacy. In accord, however, with "the pendular theory" therapeutists soon recognized that in attempting to evade one source of error by abandoning lard as a vehicle, they had inadvertently fallen into another, greater error. That the very advantages of petrolatum as a substitute for lard as an ointment vehicle, constituted its disadvantages for general employment.

Hager first directed attention to the fact that petroleum was repelled by the perspiratory pores, and that therefore it was not a suitable vehicle for ointments designed for endermic or systemic medication. The fascination of the unchangeable petroleum had, however, become so deep rooted in medical practice that it was very slowly recognized, chiefly through the researches of Shoemaker, that while petroleum served admirably for surface medication as a vehicle for zinc oxide, phenol and similar substances, it should not be used for the salts of iodine or mercury. The oleates then claimed attention, and with the oleopalmitates introduced by Shoemaker and Lawrence Wolff (1881) were considerably employed without, however, fulfilling all the requirements of practice. At this period, about 1885, a purified preparation of the so-called wool-fat appeared as the result of several investigations dating back from Hartmann

and Schultze (1868) to the most recent contribution of Liebreich that year. This so-called wool-fat was shown by Liebreich to be the excretion of the perspiratory glands, directly derived from the Keratin tissues under the first skin layer, and consisted of a mixture of cholesterins and fat acids. As such it was offensive in odor and color, and regarded as unavailable unless separated from the fat acids, which constituted about 30 per cent. of it. The acids being saponifiable by alkalies, their separation was deemed easy, until it was discovered that the soap formed by the addition of alkali and water had the effect of retaining the cholesterins in the emulsion formed by it, although the cholesterins *per se* were not acted upon by alkalies. Treatment with hydrochloric acid, while separating the emulsion, had the effect of again causing the cholesterins and fat acids to coalesce, rendering their separation impossible. The "bright idea" was then hit upon, to separate the cholesterins from the liquid soap by centrifugal power, upon the same principle that cream is separated from milk, the comparative lesser gravity of the cholesterins causing it to rise to the top in a layer, in the same manner as cream does on milk. This process was a success, and the creamy cholesterin, separated and evaporated until its water percentage was established to be within range of that required to yield an ointment of uniform ointment consistence, constituted "Lanolin." The therapeutic uses of the article being confirmed, the name of "Lanolin" was trade-marked and the product patented in Germany, the United States and other countries.

The patent was granted upon:

(1) The combination of wool-fat or cholesterins with water.

(2) The process for the separation of fat acids and purification, substantially as described in the foregoing.

(3) The sole right to the use of the term "Lanolin."

These points if sustained would, of course, give the manufacturer of lanolin the monopoly of all preparations of wool-fats for medicinal use.

To this we take exceptions, substantially for the following reasons:

(1) The so-called wool-fat exists *naturally* in combination, and has been used since the time of Herodotus *always in combination with water.*

The following history of wool-fat was contributed by G. Vulpius* (1888), and if available sometime previously would, no donbt, reverse the decision against Riedel (Berlin) prosecuted for infringing the article lanolin.

Cajus Plinius Secundus, in his natural history, book 29, says the following words of "Œsypus," the name under which wool-fat was known to the ancients:

"Even the dirt of the sheep and the secretions in the vicinity of the groin and axila (known as Œsypus) find numerous applications, and that secured from Attic sheep is considered the best."

There are different methods in vogue for preparing it for use, but the

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* Arch. Pharmacie, vol. 226, page 489.

best fat is prepared in the following manner: After taking the wool from the parts mentioned and gathering all recent wool impurities, these are together introduced into an earthen kettle with sufficient water, and moderately heated over a gentle fire.

Then after cooling, the upper layer of fat is removed and placed in an earthen vessel, whereupon the remaining mass is once more subjected to a boiling process, and the resulting fat added to the first product. It is now washed in cold water, strained through a linen cloth, and then exposed to the heat of the sun until it appears white and semi-translucent. A test of its proper quality consists in the retention of the original animal odor and in not melting when rubbed in the hand, but turning to a beautiful white color resembling white lead.

"It is invaluable in inflammatory diseases of the eye and incrustations on the eyelids. Many heat it in an earthen dish until it has lost its fatty character, and in this shape consider it more serviceable for the above named purposes." X

We glean a more extensive information on the matter, although in its main features agreeing with the above, from "Petri Andræ Matthioli Commentarii in libros sex Pedacii Dioscorides de Medica Materia," published at Venice in 1554, in chapter 67, book II, in which we find the following description:

"The greasy white wool from the neck and axilar region is considered the best. It acts beneficially in cases of contusions, denudations, moist wounds and fractures, particularly when steeped in oil, vinegar or wine, on account of its absorbing qualities and the presence of the animal impurity, known as œsipus, which is softening iu its action on the tissues.

"The fat of this greasy wool is by the Greeks called œsypus, and is by them secured in the following manner: The white, greasy wool, which has not been treated by soap root, is washed in hot water, and the dirt, which is hereby obtained, immersed in water in a large vessel and thoroughly agitated by means of a wooden spoon, whereupon a large quantity of dirty foam may be secured. To this sea-water is added, whereupon the separating fat which seeks the surface of the 'mess' is brought into another vessel, when it is again subjected to a thorough washing by additional large quantities of water. The foam is once more treated with sea-water, and then removed. This process is repeated until all fat is extracted and no more foam forms. The œsypus, after being softened by manipulation with the hands, is freed from all adhering dirt and water, whereupon fresh water is added and the whole kneaded with the hands until it barely has an astringent taste, and has the appearance of a white fat, which is then preserved in an earthen vessel. These manipulations must all take place in the hot sunshine. Many wash the collated fat with cold water, and then manipulate it as the women are in the habit of treating 'wax salve,' by which method it will take on a much purer white.

Others extract all the dirt, and from this render the fat by boiling in water, collect the fat rising to the surface, wash this with water in the manner stated above, strain into an earthern vessel containing hot water, and then after covering this with a linen cloth, expose it to the sun until it has become white and solid. Others replenish the water every second day.

"The better quality of wool-fat is that which has not been treated by soap root, which still smells of wool sweat, which turns white upon being rubbed with water in a shell, and which does not contain hard particles, which is liable to be the case when it has been adulterated with wax salve or lard. Since the sweaty wool and dirty fat, called by the Greeks 'Œsypus' and known to apothecaries as 'Hysopus humida,' has been most exhaustively described by Dioscorides, there remains nothing for me to say."

This knowledge of the nature and use of wool-fat was by no means limited to a few localities, but appears to have been quite universal; for not only the cited authors, but also Herod and Galen, speak of it; nevertheless it would appear that the two processes described served as the basis for all future communications on the subject. For the wool-fats have been distinguished by introduction into our dispensatories centuries ago. Thus for it, we find the Latin text of the following translation in the Cologne Pharmacopœia, known as "Dispensarium usuale pro Pharmacopolis," which was published at Cologne in the year 1568.

"The Œsypus is the fat of the sweaty wool and is commonly known as 'Hysopus humida' and is prepared in the following manner." The process is in the main the same as those previously described; also agreeing with the method given in the "Pharmacopœia Medico-Chymica" by Johann Schroeder, published at Augsburg in 1641.

The "Pharmacopœia Augustana renovata" (1694) describes its preparation and directs attention to the difficulties in securing a purified article. The only references to wool-fat in English works are those of Nicholas Culpepper and the Edinburgh Dispensatory, at the close of the 18th century. From this period it appears to have sunk into oblivion until Chevreul began his rescarches in the cholesterins (1856) and Berthelot (1858), which culminated in the practical application as medicine of wool-fat by the researches of Hartmann, Schultze, Liebreich and Shoemaker.

From these considerations it will be observed that "there is nothing new under the sun," but that simply new applications may be made of old substances, rendered possible by the progress of collective science, rather than by even the most brilliant individual investigation.

(2) The process by the centrifuge is nothing but a *subterfuge*. Purified wool-fat with the fat acids serves therapy as well as that without them. The crude wool-fat, pure "de gras" imported by the shipload to this country, principally from Marseilles, free from rosin oil, fish oil and other

extraneous fats, selling at about 5 cents per pound, yields an article of as good absorbent power as lanolin when prepared by the following process: 60 parts de gras is freed from grosser impurities by melting and straining. To the melted liquid 20 parts hot water is added, and 1 part potassium permanganate dissolved in ten parts water, in small quantities at a time, with constant stirring. The mixture should be heated to not exceeding 200° F., and the pot. permanganate solution added in small quantities, waiting with each addition until the ensuing reaction subsides, and when no action further sets in no permanganate solution is added, which may be determined on a watch glass. The mixture is now thrown into about 400 parts boiling water, to which has been added 4 parts hydrochloric acid, and thoroughly agitated, the boiling continued if possible by the introduction of steam into the bottom of the mixture. After separating, the water is drawn off and the fat again washed with a similar quantity of boiling water, separated, and the washing once more repeated. Upon cooling of the mixture the wool-fat may be taken out as a wax-like mass. The percentage of water it has absorbed is then determined and the fat is fused, and either evaporated to weigh 100 parts, or sufficient water is added to represent 30 per cent. of the entire mass. While yet warm, but upon the point of congealing, the mixture should be triturated until nearly cold. The more thorough the trituration the whiter and firmer of consistence the ointment. With smaller quantities difficulty is here experienced; on a larger scale the ordinary paint-mill works very satisfactorily. The product is a body of firm consistence, retained at any ordinary temperature, without the addition of wax or paraffin, as has been reported as found in the ordinary patent article, and to that extent detracting from its absorbent power. It has a slightly yellowish-white color and an odor just perceptible, though not at all disagreeable, of wool. Extended reports from physicians employing it, place it at least on a par in absorbent value with lanolin. The process of Gawalowski, extraction of the wool with benzin (deodorized), yields a still whiter product, but the recovery of the benzin from the fat and especially from the wool, is attended with considerable danger, owing to its inflammable character. The wool freed from fat or sweat by extraction with benzin, is of much softer and finer texture than when alkalies have been employed, as in the ordinary wool-washing, and commands a higher price. It may be an industry well worthy of investigation upon a large scale. In the extraction of 100 parts wool by this method about 30 parts fat or sweat is obtained after evaporation of the benzin solvent. The wool after being dried in the sun weighs 60 parts; how can the loss of 10 parts be accounted for was a puzzling question. It was found that the loss of 10 per cent. was water combined with the fat extracted with it, and lost in evaporation along with the more volatile solvent, benzin! This proves conclusively that the fat exists in nature combined with water in the same proportion for which a patent has been granted. The patent must therefore be *void*.

(3) The term "lanolin" is too descriptive a name to be given as the exclusive property of any individual. Formed from *Lana*, sheep and *oleum*, or *olein*, oil or fat, it is not an arbitrarily selected or fanciful name, but a *legitimate contraction of the most available euphonious expression of scientific derivation.*

We cannot close this sketch without referring to the value of lanoleum as a pharmic vehicle, or rather excipient. It holds the same relation in this respect to solid substances or mixtures as glycerin does to liquids, serving as a "binding medium" to fats of any consistence, and for the incorporation of water-soluble substances with those of fatty character, as in ointments, suppositories, liniments, etc.

Its values as a pharmic agent are alone sufficient to suggest its introduction in the U. S. Pharmacopœia.

The following paper read by Mr. Whelpley was accepted and referred:

DONOVAN'S SOLUTION.

BY E. GOODMAN, PH. G.

The article in question is one of five years' standing, that is, it has been standing about that long in a shelf bottle, not conspicuously exposed to the light. Incidentally, my attention was attracted to it by the deepened color and by a precipitate having made its appearance. Being solicitous to ascertain whether I, alone, enjoy such perfect immunity from dispensing so potent a remedy, I canvassed the city on the subject, with the following result: About fifty retail druggists were spoken to in every part of the city, across the river and in the suburbs to a distance of six miles. Without exception, they all said it was very little called for. Some were more specific: one druggist could only recall two prescriptions for it in five years; another made up a pint three years ago, and had it all yet; still another had made it last about six years ago, and had some of it still. I feel safe in asserting that the demand for it per druggist, in our vicinity, would not average one a year.

Several physicians were also asked whether they prescribed it often. Quite a number answered that they gave Fowler's Solution the preference; another thought that the efficiency of the arsenical preparations was overrated, and he seldom used them; one was found whose patient had increased the dose from five to twenty drops without deleterious effects, and still another used it as an ingredient in his "Sarsaparilla" for the market.

With these preliminary remarks on the frequency of its use, let us now consider the preparation itself. The specimen in question had precipitated mercuric iodide, had darkened to a brownish-yellow by the liberation of iodine, and consequently the arsenic was converted into arseniate. I am aware that the mention of these changes is not in the nature of a revelation, but my object was to ascertain the *extent* of the changes.

The supernatant liquid was filtered from the precipitate and each weighed. The filtrate weighed 255.14 grammes, while the mercuric iodide, after being perfectly dried on the filter, weighed .1134 grammes, amounting to a loss of mercuric iodide of nearly 4.5 per cent. The amount of free iodine was volumetrically estimated at 4.9843 grammes, or nearly 2 per cent. The amount of mercury remaining was gravimetrically estimated as sulphide, and the iodine gravimetrically estimated as iodides, while the arsenic was estimated by difference.

The unstable properties of the solution are directly attributable to the loose affinity existing in the iodide of arsenic, in the commercial article of which the elements are often found partially disassociated, thus introducing free iodine into the solution from the start; this exerts a double action, throwing out of solution a corresponding amount of mercuric iodide, and converting the arsenious to arsenic iodide.

In the course of my experimenting, I caused about all the mercuric iodide to be deposited from a portion of the solution, by boiling the latter with hydrochloric acid and chlorate of potassium, whereby the iodine was liberated and the red iodide thrown out of solution. The presence of the free iodine also exerts its oxidizing influence on the arsenious acid. The only remedy, of prepairing the solution extemporaneously, by commencing with the elenentary substances of the arsenious iodide, seems impracticable, considering that only two to four drachms are prescribed every year or two, in this part of the country. If the points made will have any bearing with the revision committee, in considering whether the remaining followers of Dr. Donovan shall have any further recognition, and if so, if it cannot be accomplished in a more practical manner, the objects of this paper will have been accomplished.

Mr. Ebert—In my store, I think I use at least from a quart to half a gallon of it a year, so that in my vicinity Donovan's solution is very freqeuently prescribed.

Mr. Searby read the following paper, which was accepted and referred:

A SIMPLE UREAMETER.

Urinalysis by the Pharmacist.

BY PROF. L. E. SAYRE.

It is, perhaps, conceded by the pharmacist generally, that that part of chemical analysis involved in the examination of urine, is a branch of chemistry which comes very properly within the lines of professional work of the pharmacist. It may be urged that the physician is quite competent to make all the examinations necessary of this kind; the majority of young men now graduating at our medical colleges being well equipped for accurate urinary analyses. While this is true, physicians in active practice who are convenient to a pharmacist, will not always take the time nor give the patience to making repeated, careful analyses such as

are demanded in some classes of disease. I was impressed with this fact some time ago, while visiting in one of our large cities. A physician wanted a quantitative determination of samples of urine; he was able to do the work himself, but was one of the class I have described. It fell to my lot to accommodate him, as the pharmacist (my friend), to whom he applied, did not feel himself competent to perform the work. This incident forcibly brought to my mind the importance of the pharmacist's being fully equipped for chemical work of this sort. He has the time, and the busy practitioner has not; and such chemical service as this, rendered to the physician or the patient, is sometimes of pecuniary benefit to the pharmacist.

In the college laboratory the pharmaceutical student of to-day receives a more or less thorough course of instruction in this branch of chemistry, which shows a recognition of this matter on the part of the pharmaceutical institutions of instruction.

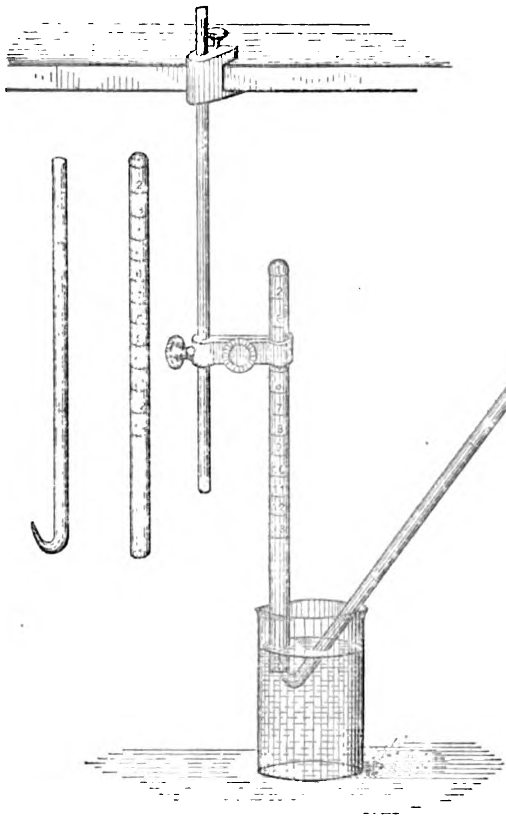
In the instruction of the student in urinary analysis, it is especially desirable that he be educated to use the simplest forms of apparatus, and to make these simple forms to have as wide a range of application as possible. It is the attempt to carry out this principle last winter in this class of work that suggests the present article. It became necessary to extemporize some home-made instrument for the use of each individual member of the class, to be used as a ureameter. With but a few suggestions on my part, the students made the following: A piece of soft glass tubing, ten inches long, and three-eighths to five-eighths inches in diameter, was provided. Over the Bunsen burner one end was carefully rounded and closed, making a sort of long and narrow test tube. This was covered with a thin film of melted wax and graduated into cubic centimeters by pouring into the tube metallic mercury, one c. c. at a time, and marking with a fine point each c. c. on the glass through the wax film. The tube thus graduated was etched in the fumes of hydrofluoric acid in the following manner: A piece of lead pipe was closed at one end; at the opposite open end, a cork was provided, through which a hole was cut just large enough to admit and suspend the glass tube. Fluor spar and sulphuric acid were introduced into the pipe, and the suspended glass tube was placed in position. After an exposure of a short time the etching was complete, and a sort of Bunsen-eudiometer was made, which served admirably as a ureameter.*

In using the tube it is first filled with a solution of hypochlorite of sodium and inverted into a beaker partly filled with the same liquid, held in position by a clamp as represented. One c. c. of the urine is introduced into the tube by means of a curved pipette, also shown in the figure. The pipette consists of a glass tube three-sixteenths inches in

* It will suggest itself to any one, perhaps, that a long, narrow test tube, graduated on paper, will answer for an extemporaneous ureameter.

diameter, and eight to ten inches in length, drawn out to a fine point and curved at the pointed end, at such an angle that it can readily be inserted up a little distance into the inverted eudiometer. The straight arm of the pipette is graduated so that between two marks, made with a file, it measures one cubic centimetre.

This simple instrument has so pleased me in the accurate results which it gave, and in the drill and independence it gave the students, that I have made it the basis of a paper to be read among our San Francisco



Ureameter.

friends. The students realized that they could be independent of the more elaborate instruments which are being figured from time to time in the journals, and the results obtained were always more satisfactory than those obtained from the use of the Professor Doremus' ureameter, which appears to be the more commonly employed. The objection to the latter I have found to be that in the hands of the students it does not furnish accurate results, because so much of the gas is allowed to escape at the open end. I have had the students compare their own with the Doremus'

instrument, using a solution of urea of known strength for the purpose. As a result they report that the eudiometer always shows more exactly the quantity of urea—gives more nearly the theoretical quantity of gas—than the ureameter of Dr. Doremus. I may add that this has been my own experience as well.

I have no doubt that this simple and inexpensive piece of apparatus has suggested itself to others, but there may be some of the craft who may not have had occasion to think of it, and may appreciate this reference to it.

MR. MAISCH.—One point of this paper, I think, should be called attention to, and that is this—that it is very often quite convenient to construct apparatus which is very inexpensive and can be used in the place of more expensive ones found in the market, in other words, it teaches us that many apparatuses can and should be made by the students, instead of merely purchasing them. I think that is a very good point.

On motion, duly seconded, the Section adjourned till 2:30 p. m.

SECOND SESSION, WEDNESDAY AFTERNOON, JUNE 26.

When the Section re-assembled at 2:30 p. m., a motion was made and prevailed that the reading of the Minutes of the Morning Session be dispensed with.

The nomination for officers of the Section was re-opened, but no further nominations being made, on motion, Mr. Ebert was requested to cast the ballot for Mr. Whelpley for Chairman, and for Mr. Dare for Secretary. Both nominees were declared elected.

Mr. Whelpley nominated Mr. J. M. Good as the third member of the Committee on Scientific Papers, and the nominee was elected by acclamation.

The following paper was read by Mr. Grazer, accepted and referred:

CANTHARIDIN IN PHARMACY.

BY PROF. F. A. GRAZER.

The use of cantharidin in pharmacy has been very limited, so far as I have been able to determine, although quite a number of methods have been recommended for separating this principle from the flies. Most of these have been used, no doubt, with a view of determining the quality of the flies, their value being estimated by the amount of cantharidin, and as a matter of experiment.

My attention was attracted to the use of cantharidin while making some cantharidal collodion. I noticed how easily this principle could be separated by the method adopted in that process. In the preparation a considerable amount of cantharidin remained undissolved by the collodion, even after agitation for several days.

It occurred to me that it would require but a little extra labor to re-

move the fatty matter with carbon bisulphide, and obtain the cantharidin in a tolerably pure state, by which the quality of the drug used might be estimated, and at the same time a collodion prepared of a known strength, by simply adding the cantharidin to the requisite amount of flexible collodion. A preparation made in this manner yielded satisfactory results.

A short time after this I was called upon to make some vinegar of cantharides according to the British Pharmacopœia. I found the process a tedious one, especially that part of the process requiring percolation, which was exceedingly slow and unsatisfactory. A preparation equally efficacious was readily made by simply dissolving cantharidin in a mixture of glacial-acetic and acetic acids, corresponding to the menstruum used in the preparation.

While I have not made any further experiments, I might suggest its use in the liniment of cantharides, and the cerate of the extract of cantharides. Referring to the last-named preparation, I have often wondered why the Pharmacopœia is burdened with two cantharidal cerates. The plain cerate of cantharides, if properly made with a good specimen of powdered flies, seldom fails to give satisfaction. The claim for the cerate of the extract is, that it is an elegant and efficient substitute for the ordinary cerate, as the greater portion of the inert matter is removed in the process adopted for its preparation.

The object of this preparation, therefore, is simply to remove the vesicating principle in as pure a state as possible, and to combine it with a suitable base. The process is somewhat cumbersome to the druggist, as it involves percolation, distillation and evaporation, the final result being the removal of the cantharidin, associated with a considerable amount of extractive. A more simple method would be to add a chloroformic solution of cantharidin to a melted mixture of wax, lard and resin, or the cantharidin may be dissolved by means of heat, in a mixture of rapeseed and castor oils, and then added. In doing this it would bé necessary to diminish the amount of lard, as the oil would render the cerate too soft.

But is this elegant and efficient substitute an improvement over the ordinary cerate? So far as I can learn, such is not the case. If the objection to this preparation be the mechanical admixture of the powdered flies, I hardly think it justifiable, as these small particles of the hard exterior parts of the insect have a tendency to irritate the skin, and thereby facilitate the vesicating action.

I had occasion, some time ago, to test the relative merit of these two preparations. The cerate of the extract failed to give the satisfaction which the cerate had previously given. That the former preparation contained sufficient cantharidin there could be no doubt, as six months after its preparation I found the entire surface thickly studded with cantharidin crystals.

Cantharidin dissolved in oil has been used in Germany. In the last issue of the *Pharmaceutische Rundschau*, New York, May, 1889, a process is given for making cantharidal oil, as formerly recommended by E. Dieterich, Helfenberg, Germany. It was made by dissolving three parts of cantharidin in two thousand parts of rape-seed oil. It has been shown by F. Eger that a portion of the cantharidin in the preparation is precipitated after a time, and he recommends the use of castor oil. The following formula is suggested for a permanent preparation: 0.3 grammes of cantharidin is dissolved in 20.0 grammes of castor oil and 40.0 grammes of rape-seed oil by means of heat, after which 140.0 grammes of rape-seed oil is added.

The main objection to the use of cantharidin is its expense. In Merck's Index, 1 gramme is quoted at $2. It can, however, be made more cheaply by the druggist himself.

The separation of cantharidin is not difficult; it is easily accomplished by percolating the powdered flies with chloroform. I have used for this purpose a narrow Whitall-Tatum percolator, in the bottom of which a cork was inserted, containing a glass tube drawn out to a fine point and curved upward. In this manner I was able to prevent the percolation from going on too rapidly. The chloroform was recovered for future use by means of an old style alembic, connected with an empty bottle, acting as a receiver and kept cool.

With a water bath placed over an ordinary spirit lamp. the distillation can be carried on until the greater portion of the chloroform is recovered. The fat can be removed after evaporating the remaining chloroform by means of carbon bisulphide or petroleum ether. In this manner it may be obtained sufficiently pure for pharmaceutical purposes. The powdered drug as found in this market is generally good, containing about 8 per cent. of moisture and a fair yield of cantharidin.

Other processes have been recommended, such as treating the flies with alkalies, and subsequently with acid before using chloroform or ether, by which means a larger yield is obtained. Perhaps the best method is that of dialysis, recommended by E. Dieterich. But as far as the commercial article is concerned, it is yet too expensive to be used, at least in this country.

I would, therefore, recommend the druggist to prepare it himself, as I believe that cantharidin could be used in a number of the pharmaceutical preparations now kept in the stores, thereby saving considerable time, besides securing preparations of known strength, which is always an object to be desired.

MR. GRAZER.—While in the exhibition room my attention was called to samples of Spanish flies, in which the amount of cantharidin was estimated. In this sample which I hold here the flies contained 1.2 per cent. of cantharidin, and this one only .5 of 1 per cent. Both were received at the same time and from the same firm, and it shows you the necessity of making a quantitative estimation of the cantharidin in this animal drug.

A short time ago a paper appeared in the *Pharmaceutical Record* published by Mr. Braithwaite, and I thought that would result in making another species of flies, the Chinese flies, the cheaper article, and that they might be met with in commerce; but I have heard very little since that time. I wrote on to Mr. Braithwaite, in England, and asked him for a sample of the species of flies that he referred to in the *Pharmaceutical Reord*, and he sent me some samples. This is all that he sent me. (The speaker then passed the specimens around among the members)

While I was in the College of Pharmacy, I sent East for some Chinese blistering flies, and they very much resembled one of those flies, the Mylabris lunata.

In preparing cantharidin for the market, the manufacturer takes great pains to have it white and as presentable as possible, but that is not necessary. (The speaker then exhibited a number of samples to the Association.)

MR. HALLBERG.—I can corroborate the statement made by Prof. Grazer, if it needed any corroboration, especially with reference to the process of making the vinegar of cantharides. It is a very tedious and objectionable process. Percolation is not suitable; maceration and expression must be used, and it is very difficult to express, and you cannot handle it with your fingers. Therefore, a simple method of this kind will unquestionably yield a more efficient preparation, and one that can be prepared with very little discomfort. I think the paper is a very valuable one, having bearings on all preparations concerning cantharides.

MR. SEARBY.—The paper before us has a bearing upon what we might call practical accuracy as distinguished from absolute accuracy. The great value of this paper consists in the process given us, furnishing us with a means of obtaining a reliable preparation of cantharidin every time at a very moderate expense, without being compelled to buy the chemically pure article. An article so nearly chemically pure meets all the requirements of the case, and for accuracy it is just as good as if it were chemically pure. It is in this direction that we want to aim—to aim at practical accuracy without absolute chemical purity, which is not always essential. There are many cases in which just such a principle as is here carried out, will probably be adopted before many years are over.

MR. CALVERT.—As Prof. Grazer mentions the price of cantharidin in his paper, I would like to ask him what would be the average price of cantharidin to the druggist who makes it himself.

MR. GRAZER.—I have not calculated the average cost in that direction, bui I should judge it would be considerably less than what is mentioned in Merck's index, and I think it would pay a retail pharmacist to manufacture it, even if costing as much as two dollars a gram. I don't think it would cost more than two-thirds of the price mentioned in Merck's index, but a great deal depends upon the quality of flies, as you have seen. One sample of flies will contain only five-tenths of one per cent., and another will contain one and two tenths per cent. If carried on on a larger scale, it could be made somewhat cheaper. Using chloroform, the price may be somewhat expensive, but it would be cheaper than the cantharidin offered by Merck at two dollars a gram. I have made a number of preparations, but I am not prepared to say definitely how much it would cost to make cantharidin.

Mr. Ebert read the following paper :

ON THE USE OF COMMERCIAL GLUCOSE IN PHARMACY.

QUERY 21.—Has Syrup of Dextrin a use in Pharmacy? Give some instances where it could to advantage replace Cane Sugar Syrup.

BY FRED. A. ROMETCH, CHICAGO.

This query is treated with the understanding that by syrup of dextrin is meant the article found in the market under the name of "glucose." Preparations made from dextrin, sugar and water, in definite proportions, will find no further consideration here, although it must be admitted that in their uniform composition and purity they possess very commendable qualities.

The query from this point of view has for its object, the use of "glucose" in pharmacy. A wide-spread belief attributes to glucose and oleomargarin the same social and political character. Their manufacture, it is claimed, is mainly undertaken for illegitimate purposes, for practicing deception in the shape of substitution pure and simple, or of adulteration, that is, partial substitution.

This popular belief has a foundation. Parties using these articles disclaim their connection with them—they even deny their acquaintance. Glucose and oleomargarin are manufactured in large quantities, and to outsiders disappear in a mysterious way from sight. They are used to satisfy what is insatiable—the greediness of man. The elements of fraud entering so vastly into the consumption of glucose, I have deemed it necessary to assert my standpoint before I come to speak of the use of glucose in pharmacy.

Every druggist is loud in his condemnation of the shameless fraud practised on him, when he for instance orders honey, or soda water sprups, or extract of malt, and receives but flavored or colored glucose. It needs no special assertion that we, with all honest druggists, deprecate fraudulent practices, and that we in no way will recommend the partial or entire substitution of glucose in preparations, the composition of which is expected to be free from it.

The legitimate use of glucose in Pharmacy can be but limited, and Is based on the qualities of its main constituents, dextrin and grape-sugar. Where one or the other of these, or both together, are of a special use in pharmaceutical preparations, glucose may find a place.

There are a number of different grades in the market, varying in color and density, and their relative proportion of dextrin aad grape-sugar. An article called by syrup mixers "mixing glucose," is a fair representative of glucose. It is a thick, syrupy, colorless liquid, of about 1.40 specific gravity, containing 40–45 per cent. of grape sugar, and a like quantity of dextrin. Such a composition would well fit it for holding substances in a state of suspension, *e. g.*, oils, powders, resinous substances, just separating from tinctures and fluid extracts, when being mixed with watery fluids, etc., etc. With this object in view, a considerable quantity of

glucose must be used to be efficient, certainly enough to create a mucilaginous menstruum. It offers, however, no advantage over gum arabic; and is for the purpose named not as effective as a mucilage of gum tragacanth.

Oil emulsions are rendered more liable to fermentation by an admixture of glucose, the decomposition at the same time effecting a separation of the oils. Emulsions of the balsams keep far better, the balsams acting us anti-ferments. For the preparation of certain pill masses, it is useful; for instance, those containing quinine, bismuth and the like, and especially vegetable powders. But here it must be remembered that the masses containing insoluble mineral powders need great attention, lest the ready made "pills" flatten out in one half-solid lump. Such mass needs protracted working in the mortar, and when finished must be rather hard. The absorbent qualities of the vegetable powders insure a more stable pill-mass. Glucose has a tendency to keep pills from drying out and preventing passing through the digestive tract undissolved.

For the above identical purpose, I have been in the habit of using a thick, syrupy mass made of glucose and gum arabic, which admirably answers the purpose.

I will merely touch upon the employment of glucose in the soda water trade; although I am aware of the fact that it is largely used in this particular instance. If used at all, it should be used sparingly, perhaps one part of glucose to three or four parts of cane sugar syrup; for it is to be remembered in this connection that syrups develop their respective flavors to a greater extent when mixed with water charged with carbonic acid gas than when mixed with plain water. The reason of this is, that gas, after removal of the pressure, is liberated from the mass in most minute pearls. These, in rising, carry with them the odoriferous portions of the sweetening medium. Flavors, however, presented in this form, are far more appreciated by the tongue, which in this case in no small degree is assisted by the Schneiderian membrane of the nose. If, therefore, glucose should possess the most remote foreign smell or taste, it should not be used for soda water purposes, so much the more as there are other means for imparting to syrups their foaming qualities.

Glucosized soda water syrups are to be kept on ice, lest fermentation set in.

Syrup of iodide of iron has ever been a bugbear to dispensing pharmacists, on account of its changing appearance and composition. Grape sugar being easily oxidized, has been successfully used as a protective agent to syrup of iodide of iron, in the shape of an addition of honey or grape sugar. Cane sugar may be partially replaced by glucose, and the writer has at this moment on his desk a specimen of syrup of iodide of iron, one-third of its volume consisting of glucose, and which to-day, after ten months' standing, and frequent opening of the bottle, possesses

all the characteristic marks of a good pharmacopœial syrup of iodide of iron.

For the preparation of syrup of the hypophosphites with iron, glucose offers some advantages. The syrup keeps well, and no iron is deposited.

The syrup of hydriodic acid also keeps well, without the addition of potassium hypophosphite, when glucose is used for its preparation.

For use by the pharmacist in making of his "own" proprietary medicines, such as "sarsaparilla with iodide of potassium," "worm syrup," or "soothing syrup," glucose can advantageously be used—keeping, however, in mind its readiness to ferment, which necessitates the presence of sufficient alcohol or another anti-ferment, in order to make the preparation permanent.

Mr. Ebert.—Mr. Chairman, the author of the paper was rather prejudiced against glucose when the query was allotted to him. Of course it was not to be expected that he should find it good for all preparations. It is true in what he says in regard to glucose used in soda water syrups. Commercial glucose is prepared for different purposes. Confectioners use it as a substitution for gum arabic, or in making stock candy. This confectioners' glucose always contains either a little free sulphurous acid or some of the bisulphites, for instance, bisulphite of soda. If this confectioners' glucose is used in making the soda water syrups, of course that would be objectionable, because in drinking the soda water you would at once get that sulphurous taste; but a glucose that does not contain either the salt or free sulphurous acid would not have this objection—it is a perfectly bland syrup when it is free from these foreign additions. The advantage that it has in soda syrups is that it gives body to the soda water. I know that a gallon of simple syrup made with clean sugar, containing a quart of good glucose, and flavored with either a fruit juice or vanilla, gives a more pleasant taste than a syrup made of pure cane sugar. It has not the intense sweetness. I think as a rule the intense sweetness of cane sugar is objectionable as a food or a drink. Why are glucose syrups at the present time generally used? Because they are not so sweet, and possess a very bland taste. I have never tasted the so-called rock candy syrups, but I consider them mixtures of glucose and cane sugar. Instead of paying exorbitant prices for these rock candy syrups, you can just as well make that mixture yourself. In commerce we call this glucose; it is not glucose, it is simply a syrup of dextrin. This is real glucose chemically speaking. (The speaker exhibits different samples.) The name glucose is used in this country for this syrup. The reason of it is that when it was first imported into this country, to obviate the high duty on syrups at that time, it was imported by the chemical name of glucose. It is simply a mixture of dextrin and grape sugar. Outside of this country it is not known anywhere else as glucose, not even in Great Britain; there it is known as starch syrup or dextrin syrup. This grape sugar or glucose has a purity of 99.7 per cent. of absolutely pure grape sugar. It is made by a process which was patented by Dr. Behr, of Chicago. Formerly it was made by using alcohol in throwing out all the dextrin, and thus getting it pure. The improvement of Dr. Behr consists in crystallizing the grape sugar from a concentrated solution which is free from impurities, and kept at a temperature of 90° F., the adherent liquid syrup being removed by centrifugal force. Pound for pound, this grape sugar is equal to cane sugar, not in sweetness, which is simply a physical property of cane sugar, but it is a pure saccharin. It contains nothing that is injurious, and is just as wholesome and valuable for some purposes as cane sugar, though not for sweetening. I believe that dextrin syrup is of great value in some of the operations in pharmacy. In manufacturing your own cough mix-

tures, if you will use commercial glucose instead of using cane sugar, you will make a better syrup. Scientific men will not object to its use because sulphuric acid has been used in the manufacture of it. As long as it is free from foreign substances, why should it be objectionable?

Mr. Calvert.—I would like to ask some of the gentlemen from Chicago what is the state of their cane sugar market as regards purity—whether they have ever observed as much as ten per cent. grape sugar in the cane sugar in that market.

Mr. Ebert.—There is not a particle of refined cane sugar in the market that contains grape sugar. The firm that attempted this lost five hundred thousand dollars by making that experiment. The two don't mix, or rather the mixture goes into a solid mass in a short time. There is no cane sugar adulterated with grape sugar, and don't let that ever bother you.

Mr. Calvert.—I will tell you why I asked the question: I had occasion several years ago to investigate the subject, and I found in one sample of cane sugar not less than ten per cent. of grape sugar, by Fehling's solution.

Mr. Ebert.—I acknowledge that, but you did not find grape sugar—it was an uncrystallizable cane sugar; it had been converted from saccharose into a lævulose, but glucose was not added to it. If you will heat cane sugar with acids, you transform the cane sugar into lævulose and invert sugar, and make candy.

Mr. Maisch.—If you dissolve it in boiling water and merely keep it for a day or two exposed to the light, it will be partly changed to invert sugar.

Mr. Hallberg.—I have had some experience with this anhydrous glucose. A peculiar quality of it is that moistened with water it slacks just like lime, and afterward absorbs a certain amount of water, when it falls into a powder—is then perfectly dry and don't seem to absorb any more water; but in the anhydrous state it is slightly hygroscopic. That peculiar feature of it suggested itself to me as making it adapted for powdered extracts instead of sugar of milk. I used it about a year ago, and have some samples yet—it seems to protect the extracts from absorbing moisture from the atmosphere, and I think it would be a better article than milk sugar for that purpose. I don't suppose there is any one here but who will recognize the value of glucose as a pill excipient. Another pharmaceutical use for it is to give body to liquid preparations. It is far superior to sugar in some mixtures, and it prevents precipitation to a certain extent. I should like to see it introduced in the Pharmacopœia for pharmaceutical purposes.

Mr. Searby.—I am pleased to hear that we have within reach such an exceedingly valuable substance. We are told that it is excellent for keeping pills moist; it is equally excellent for keeping extracts dry. It is something like brandy, which some people take when they are hot to cool them off, and others take when they are cold to make them warm.

Mr. Hallberg.—The kind that is good for an excipient has already got its full share of water; the one that is used for protecting extracts from the moist atmosphere, is the anhydrous glucose.

Mr. Searby.—I understand that, but I was simply calling attention to the wonderfully different properties this substance has under different conditions. Let us give the devil his due. Glucose has been very badly abused; it has been accused of doing things that it could never be justly accused of doing. Glucose is really a valuable food; it is a valuable nutrient; it is useful to a great many ways; and we as intelligent men

should know when to discriminate between its proper and its improper use. For the most part it has been used properly, excepting that it has often been sold under misrepresentation. The harm is not in the use of glucose for sugar, or food, or for any purpose for which it has been used, but the harm is in putting it forward for what it is not. It is not cane sugar; it is not a sweet sugar in the ordinary sense of the term, and it should not be sold for sweetening purposes; but when it comes to be estimated at its true worth, it will be a very valuable product, and one the proper use of which we should encourage. There is any amount of grain in this country which cannot be put to better use than in the manufacture of this product; it is a great deal better than turning it into whiskey.

The Chairman called for the reading of a paper on pepsin testing. Objection was made, and after some discussion in which Messrs. Hallberg, Calvert, Stevens, Ebert and Ray participated, the paper was, on motion of Mr. Hallberg, read by title, and referred to the Committee on Publication with power.*

RELATIVE VALUE OF VARIOUS PEPSIN TESTS.

BY F. A. THOMPSON, PH. C., DETROIT, MICH.

In investigating this subject, one finds any amount of literature pertaining to the various methods, official and otherwise, for testing the proteolytic activity of various pepsins found in the market. When the claim is made that a certain pepsin will dissolve so many grains of albumen, it signifies that it will meet that claim under certain conditions, which are usually published in conjunction with it.

Knowing that these claims of activity have a limited comparative value, I was favorably impressed with the idea of subjecting the leading pepsins to the conditions of the official and other tests, and thus presenting to the pharmacist, as well as the physician, a ready reference for knowing the relative or comparative value of those brands most commonly prescribed. Every one familiar with the subject of pepsin testing, understands that the length of time for boiling the eggs, the proportion of water and albumen, division of albumen, acidity and temperature, each exerts its peculiar influence in increasing or decreasing the activity of any pepsin.

The time of boiling eggs has been generally accepted as fifteen minutes, this length of time giving the most constant results. In all the tests mentioned, I have boiled the eggs this length of time, afterward immediately placing them in cold running water.

The proportion of water to albumen is an important factor, when the same pepsin will be found to dissolve more in a dilute solution than in a concentrated one, other conditions remaining the same. The quantity of acid present in the digestive fluid, exerts a decided influence over the dissolving power of any pepsin. An increase of acidity above 0.2% absolute hydrochloric acid decreases the digestive power, and a decrease

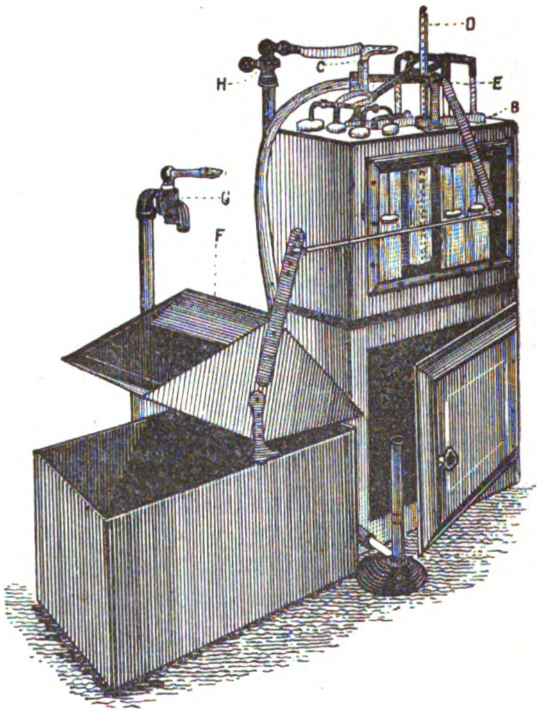
* The Committee on Publication decided that it was a proper paper for the Proceedings, containing nothing in antagonism with the aims of the Association.—PERMANENT SECRETARY.

below this amount of acid also lessens the digestive or dissolving power. This would seem to prove that the amount of acid estimated to be present in the stomach (from 0.2 to 0.25% of free acid) is the proper quantity to use to obtain maximum results. Regarding the temperature during digestion, it is a well-known fact that on increase of temperature to 130° F., or the maximum temperature for digestion, the dissolving power is increased, and *vice versa*. The fineness of division of the egg albumen is not stated in the official, though given in the British Pharmacopœia and National Formulary, the latter having adopted a requirement that the egg albumen shall be passed through a sieve having 30 meshes to the linear inch. I deemed it advisable to use the albumen of this division in all the tests given. The official test also fails to state how the digestion shall be treated during the test, though the general rule is to shake the flasks containing the digestive fluid every few moments. I have been able, however, to do all my work with somewhat more exactness than by this irregular shaking by hand, which does not give uniform results from day to day. The apparatus used afforded the means of maintaining the digestive fluid at a constant temperature, and having the albumen stirred with uniformity by means of rubber discs attached to glass rods, these being attached to a frame which was run by a water motor. (See figure given below, or Druggists' Bulletin, May, 1888, and Proceedings of the American Pharm. Asso'n, 1888, p. 145.

SCHEDULE OF VARIOUS TESTS.

Tests.	Parts of water to one part of albumen.	Percentage of absolute HCl.	Period of digestion.	Temperature Fahrenheit (Celsius).	Treatment during digestion.	Requirements for one part of pepsin.	Condition of Albumen.
U. S. P. 1880.	10	0.47	5 to 6 hours.	100° to 104° F. (38° to 40°).		Should digest at least 50 parts.	
National Formulary, 1888.	10	0.20% intended (0.16 used).	60 minutes.	125° (51.6°)	Shaken well at intervals of 5 minutes	To dissolve 500 parts, which is ¾ the am'nt taken.	Through a No. 36 hair sieve.
British Pharmacopæia, 1885.	4.37	0.38	30 minutes.	130° (54.4°)	Well stirred.	Will dissolve 50 parts.	Albumen through a wire gauze of 36 meshes.
Modified U. S. P.	10	0.30	6 hours.	104° (40°)	Uniform stirring.	Shall promptly dissolve the am'nt taken.	Albumen through a No. 30 brass sieve.
Author's proposed test for the 1890.	10	0.20	3 hours.	Constant at 98.5° F. (37° C.)	"	"	"

In this paper I have considered the following tests:—U. S. P., National Formulary, British Pharmacopœia, modified U. S. P., and a proposed test for the Pharmacopœia of 1890; also the National Formulary test, requiring complete solution of the albumen, instead of allowing one quarter of the albumen taken to remain undissolved at the close of the experiment. The various brands of pepsin examined represent four scale and five amorphous or powdered products, which include the leading pepsins prescribed at the present day. The samples were all procured directly from the manufacturers in original packages, and at a recent date, except sample No. 1, which I have had for more than a year and used as



Improved Pepsin Tester.

Devised in Parke, Davis & Co.'s Analytical Laboratory, and used in all my experiments.

a standard in all my experiments, having found it to possess the highest digestive power of any, readily soluble and permanent in activity. I consider that we have a product varying widely in value (and all brands of it are purported to be the best) and conceded to be one of the most important of our materia medica; therefore any light that may be thrown upon this subject by knowing the behavior of some of the leading brands, is certainly a step toward assisting the pharmacists aud physicians to work mose intelligently, thus placing them in a position to know more regarding this digestive ferment.

(*a*) U. S. PHARM. TEST.

One part of (saccharated) pepsin dissolved in 500 parts of water. acidulated with 7.5 parts of hydrochloric acid, should digest at least 50 parts of hard-boiled egg albumen in 5 or 6 hours, at at emperature of 38° to 40° C. (100° to 104° F.).

In carrying out the official test, I boiled the eggs 15 minutes and passed the cold albumen, free from superficial moisture, through a No. 30 brass sieve by means of a stiff spatula, these conditions not being stated in the test. The results given here indicate the number of grains *dissolved completely* by one gr. of each pepsin.

No. 1	dissolvəd	completely	1,200 gr.
" 2	"	"	550 "
" 3	"	"	550 "
" 4	"	"	550 "
" 5	"	"	400 "
" 6	"	"	250 "
" 7	"	"	100 "

(*b*) NATIONAL FORMULARY TEST.

"*Preliminary Assay.*—Prepare an acidulated water by mixing 1 litre distilled water with 55 c.c. (6.38 grams*) of hydrochloric acid. Mix 0.1 gram of the dry and undiluted pepsin with 0.9 gram of sugar of milk, by thorough trituration in a wedgewood morar. Weigh of this mixture four portions of 0.05 grm. (*a*), 0.06 grm. (*b*), 0.1 grm. (*c*), and 0.2 grm. (*d*) respectively, place each portion into a wide-mouthed glass or bottle, with a capacity of 200 c.c., together with 80 c.c. of the acidulated water previously warmed, and set the flask in a water bath, the temperature of which is maintained constantly at 51.6° C. (125° F.) After twenty minutes, add to the contents of each flask 10 grm. of hard-boiled egg albumen, prepared by boiling fresh eggs for fifteen minutes, then separating the whites and rubbing this through a clean hair sieve, having thirty meshes to the linear inch. Each portion of 10 grm. of egg albumen is to be put into a small, warmed mortar, triturated with a portion of the fluid from one of the flasks, the mixture then transferred to the latter, and the mortar rinsed with 20 c.c. of warm, acidulated water, which is added to the contents of the flask. Keep the flasks in the water bath for sixty minutes, shaking well at intervals of five minutes, and at the end of that time note the condition of the egg albumen in the several flasks. If the pepsin is of good quality, not more than a few undissolved flakes should remain in any but the first flask (*a*). If more than this remains in the fourth flask (*d*), the pepsin should be rejected as being below the requisite standard.

*The quantity stated in the Nat. Formulary is 5 grams, which produces a fluid containing 0.16 per cent. absolute hydrochloric acid, and not 0.2 per cent., as intended by the revisers or originators of this test.

"*Actual Assay.*—Having thus ascertained the approximate digestive power of the pepsin, and having found this to be of satisfactory strength, make at least two assays in precisely the same manner as just described, but using such a proportion of egg albumen that about one-fourth of it will remain undissolved at the close of the experiment.

"Then add to the contents of the flask 3 grm. of finely scraped and purified asbestos, previously dried to a constant weight, and afterwards add 100 c.c. of cold distilled water. Shake the flask strongly, until the asbestos has clarified the liquid as far as possible, then transfer the contents of the flask to a tared filter (deprived of matters soluble in hydrochloric acid), wash the residue with distilled water, until the washings cease to affect test solution of nitrate of silver acidulated with nitric acid, and dry the filter with contents at a temperature of 105° C. (221° F.) to a constant weight. From this deduct the weight of the filter and asbestos. Multiply the remainder, representing the undigested and dried albumen, by $7\frac{8}{10}$, to find the quantity of moist albumen to which it corresponds, and deduct the product from the amount originally used, to ascertain the proportion dissolved by the pepsin."

The results given were obtained by the actual assay test, that is, allowing one-fouth of the albumen to remain undissolved at the close of the experiment. From previous experience I may say that I have never been successful in carrying out the directions of this test, that is, in determining the amount of undissolved albumen, and, therefore, with all due respect to the originators of this test, I beg to say that I am convinced that the scheme of adding scraped asbestos and filtering is more of a theoretical than a practical one, as I have found it quije impossible to filter the digestive fluid in a reasonable time, even by the aid of a Goosch filter-pump. To obtain the following results, I immersed the container (large test tube) in cold running water, and washed the albumen by decantation with cold distilled water, until free from acid albumen and peptone, then drying and weighing the residue as dried egg albumen. The results here also indicate the dissolving power of 1 gr. of each pepsin, allowing one quarter of the albumen taken to remain undissolved at the close of the test.

No. 1	2,500 gr.
" 2	1,000 "
" 3	1,000 "
" 4	1,000 "
" 5	1,000 "
" 6	650 "
" 7	300 "

(*c*) BRITISH PHARMACOPŒIA TEST:

Two grains of pepsin with an ounce of distilled water, to which 5 minims of hydrochloric acid have been added, form a mixture in which,

at least, 100 gr. of hard-boiled white of egg, passed through wire gauze of 36 meshes per linear inch and made of No. 32 brass or copper wire, will dissolve on their being well mixed, digested and well stirred together for 30 minutes at a temperature of 130° F. (54.4° C.).

Results by this test as given here indicate how much coagulated egg albumen is completely dissolved by 1 gr. of each brand.

No 1	dissolves	completely	175 gr.
" 2	"	"	100 "
" 3	"	"	100 "
" 4	"	"	100 "
" 5	"	"	60 "
" 6	"	"	50 "
" 7	"	"	20 "

(*d*) MODIFIED U. S. P. TEST.

This test differs from the official only in the quantity of acid present in the digestive fluid, which is 0.3 of absolute hydrochloric acid, while the official test contains 0.47 per cent. of acid, and the temperature used was constant at 104° F. Comparing these results with those given of the official, it is readily seen that the results are much higher, due to the decreased quantity of acid. This table represents the proteolytic power of 1 gr. of each pepsin examined.

No. 1	dissolved	completely	2,000 gr.
" 2	"	"	1,000 "
" 3	"	"	1,000 "
" 4	"	"	1,000 "
" 5	"	"	900 "
" 6	"	"	700 "
" 7	"	"	250 "

(*e*) PROPOSED TEST FOR THE U. S. P., 1890.

Pepsin.—The digestive principle of the gastric juice obtained from the mucous membrane of the stomach of the hog, and capable of *completely dissolving* not less than 500 times its own weight of hard-boiled egg albumen, under the conditions prescribed by the process of assay given below.

Assay.—Prepare an acidulated water containing 0.2 per cent. absolute hydrochloric acid, by mixing 5.5 c.c. (or 6.38 grm.) of hydrochloric acid (sp. g. 1.16, and containing 31.9 HCl.) with 994.5 c.c. of distilled water. Boil two or three eggs for fifteen minutes; when cold cut into two pieces; separate the whites; carefully remove all superficial moisture, and by the aid of a stiff spatula, press through a No. 30 brass sieve. Measure out 100 c.c. of the acidulated water and place 10 grm. of the finely-divided egg albumen in a medium sized mortar, triturate with a portion of the acid fluid added gradually, until of a uniform mixture,

then transfer to the flask or container, and with the remaining fluid ensure the removal of all particles of the albumen, avoiding any loss of the fluid. Repeat this operation for each container, and then place them in a water-bath, provided with a suitable apparatus for maintaining a constant temperature. When the digestive fluid has reached 98.5° F. (37 C.), add the following amounts of the pepsin under examination:

(A), 0.035 grm., (B), 0.025 grm., (C), 0.020 grm., (D), 0.015 grm., and after digesting 3 hours at this temperature, remove the containers, fill with cold water and place in cold (running) water. After one-half hour or longer there should not be deposited more than a few particles in container C, and if more than this in B, the pepsin is below the standard requirement.

To determine more closely the actual dissolving power of the pepsin, repeat the operation, using amounts of pepsin nearer the proportion found necessary for complete solution of the albumen by the preliminary assay, reading the results in a similar manner.

In devising this test, it is with the intention of giving one which bears some relation to the conditions maintained in natural digestion. While we all know it is impossible to imitate exactly the physiological process governing digestion, I think we can work, however, with a temperature nearer to that of the body, use the same quantity of acid found present in the stomach, and also digest about the average length of time that the food remains in a normal stomach, rather than disregard all the natural conditions by using the maximum temperature (130° F.) and an abnormal quantity of acid. The proportion of albumen and water used must necessarily be an arbitrary one. A dilute solution, *i. e.* 1:10, would seem to be much more satisfactory, or representing a natural digestion, than a concentrated one, which would give a stronger solution of the products, acid albumen and peptone formed, which would have an increased retarding action on the dissolving power of the pepsin. In the natural digestion these products, which are undoubtedly produced in minimum quantities in the stomach, are rapidly eliminated, and thus exert no retarding influence on the proteolytic action of this digestive ferment, pepsin.

If the National Formulary requirement for pepsin is understood to be a complete solution of 500 times its own weight of egg albumen, then the standard of digestive strength has been increased to 13 times stronger than the U. S. P. requirement for saccharated, equivalent to 25 times stronger, based on the modified official test. That is, a gram of pepsin capable of *completely dissolving* 500 gr. of albumen, by the conditions of the National Formulary test, is capable of completely dissolving nearly 650 gr. by the official, and 1250 by the modified official. We have in sample No. 1, possessing the highest digestive power of any examined, a product one and three-fifths times stronger than the above National For-

mulary requirement, and without doubt as strong a product as would seem advisable to dispense, until more is known regarding the action of this ferment. While pepsin has not been isolated as a known pure substance, as yet, it would seem as if we were approaching such a product, as I have examined several samples submitted by the manufacturers of product No. 1, and found them to be two or three times stronger in digestive power, or capable of completely dissolving from 1,500 to 2,000 times their own weight of albumen by the National Formulary test, and 4,000 to 5,000 by the modified official. At present a pepsin of this extremely high digestive power would hardly seem convenient for dispensing, requiring to be administered in inconveniently small doses; otherwise it might produce (unknown) untoward effects, as a result of its extreme activity.

According to the conditions of the proposed test, the following results were obtained, indicating the comparative and actual dissolving power of one gr. of each pepsin.

No. 1	dissolved	completely	600 gr.
" 2	"	"	300 "
" 3	"	"	300 "
" 4	"	"	300 "
" 5	"	"	250 "
" 6	"	"	150 "
" 7	"	"	50 "

(*f*) NATIONAL FORMULARY TEST, MODIFIED.

In reviewing the National Formulary test, I find that the preliminary assay states that if the pepsin be of a good quality, not more than a few undissolved flakes should remain in any but the first flask.

(A) If the pepsin were capable of doing this, it would almost completely dissolve 2,000 times its own weight of coagulated albumen, or four times the amount required. Then it further states that if more than a few particles remain in the fourth flask, the pepsin should be rejected as being below the requisite standard. This would seem to indicate that if the pepsin was not capable of (nearly) completely dissolving 500 times its weight of albumen, it should be rejected, while on the other hand, if it lèaves only a few particles, it states in the actual assay that you shall use such a proportion of egg albumen that about one-quarter of it will remain undissolved at the close of the experiment. These statements will not appear to be discordant to the inexperienced operator, while they would to one more familiar with the subject. When any pepsin is allowed to act upon more albumen than it can dissolve in a given time, the actual amount dissolved is much increased; in fact, three times larger than if it were required to dissolve completely the quantity taken. This is illustrated in comparing colums B and F of the recapitulation table. If the National Formulary requirement were complete solution of the 500 times

its own weight of albumen, or the amount originally taken—and I am convinced that complete solution is the best method of reading results—then the various pepsins examined have the following activity, the table below indicating the amount of albumen completely dissolved by one gr. of each brand.

No. 1	dissolved completely	800 gr.
" 2	" "	350 "
" 3	" "	350 "
" 4	" "	350 "
" 5	" "	300 "
" 6	" "	200 "
" 7	" "	75 "

RECAPITULATION OF THE RESULTS OBTAINED BY THE VARIOUS TESTS.

Quantity of Coagulated Egg Albumen Dissolved by One Gram of Each Brand.

		A	B	C	D	E	F
	PHYSICAL PROPERTIES.	U. S. Pharmacopœia, 1880.	National Formulary, 1888.	British Pharmacopœia, 1885.	Modified U. S. P. 1880.	Author's proposed test for U. S. P., 1890.	National Formulary modified, *i. e.*, complete solution.
1	Soluble, semi-transparent scales, free from objectionable odor and taste.	1200	2500	175	2000	600	800
2	Opaque amber scales, putrefactive odor and quite insoluble.	550	1000	100	1000	300	350
3	A light gray, largely soluble powder and free from objectionable odor or taste.	550	1000	100	1000	300	350
4	A light yellow powder, free from objectionable odor and largely insoluble.	550	1000	100	1000	300	350
5	Yellow scales, strong putrefactive odor and exceedingly hygroscopic.	400	1000	60	900	250	300
6	Gray powder, largely insoluble and odorless.	250	650	50	700	150	200
7	Amber scales, soluble, free from bad odor and very hygroscopic.	100	300	20	250	50	75

Mr. Hallberg read the following paper:

ON THE QUALITY OF COMMERCIAL BELLADONNA ROOT.

QUERY 6.—What is the quality of Belladonna root as obtained through reliable dealers?

BY W. SIMONSON.

The material for use in answering this question was obtained through correspondents in Boston, New York, Philadelphia, Cleveland, Columbus, Chicago, St. Louis, Kansas City, San Francisco and Cincinnati.

Of the specimens, as received, about eight ounces was ground to num-

ber 50 powder, well bulked, and 40 to 50 grams powdered in a mortar until less than one gram failed to pass a number 100 sieve. After well mixing the siftings, 10 grams, tightly packed in a small Soxhlet tube, was extracted for four or five hours, when, having changed the receiving flask, the extraction was continued until fifteen to twenty c.c. of percolate, evaporated and the residue taken up by one drop of diluted hydrochloric acid, contained not enough alkaloid to react with test solution of potassio-mercuric iodide. The solvent employed is that recommended by Dunstan and Ransom, a mixture of equal volumes of chloroform and absolute alcohol, and the remainder of the assay was conducted as directed by them, except that the percolate was extracted with acidulated water instead of pure water, and that the aqueous solutions of the alkaloids were washed repeatedly with chloroform before making alkaline for withdrawing the alkaloid with fresh chloroform. In ten assays of a good specimen of root (No. 7), seven gave, from 10 grams, .505 to .512 alkaloids, and in the remaining three the process was varied by drawing the alkaloids from chloroform to acid solution, washing this with two volumes of chloroform, in two portions, making alkaline, and extracting with pure chloroform. These last solutions yielded the alkaloids in crystals, pure white, and giving colorless solutions with one c.c. water and two c.c. dilute sulphuric acid. The weights were .505, .508 and .503. From this it was assumed that the colored alkaloid is sufficiently pure for weighing, and the weights given below are for such colored residues.

In no instance, when tested with ammoniacal ether, was the powder *completely* exhausted, the additional quantity of alkaloid so obtained showing the previous extraction to have reached 96 to 97%. A specimen of very poor root gave .223% by Squibb's method of assay, carrying the extraction further than he directs, and .220% by the one used for this work; so that the results appended show what would be obtained in liquid preparations of the drug, rather than what it contained in fact.

In respect to size and external appearance, the specimens received in the entire state may be separated into three groups, but not sharply divided:

First. Small, 3 to 5 m.m., rarely 7 to 8 m.m. in diameter, very light colored, longitudinal wrinkles shallow; very brittle, fracture short and mealy, seldom compact and horn-like; better specimens mostly split, nearly free from knotty heads and short sections of stems, poorer ones containing these (¼ to ½) and partly or not at all split.

1.	Cincinnati	1888,	.220 %	alkaloids.
2.	"	"	.336 "	"
3.	"	"	.285 "	"
4.	Columbus (Importer "A")	1889,	.321 "	"
		Duplicate,	.326 "	"
5.	New York (Importer "A")	1889,	.357 "	"
		Duplicate,	.365 "	"
6.	Cleveland (Importer "A")	1888,	.365 "	"

Second. 10 to 15 m.m. in diameter, light brown to brown, longitudinal wrinkles much deeper than in preceding; fracture short, grayish brown to dark brown, mealy or (mostly) resinous and horn-like; knotty heads and stems formed about one-fifth of better specimens, except 7 and 8, and nearly ¾ of poorest one.

7.	New York (Importer "A")	1887,	.505 % alkaloids.
8.	Cincinnati	1888,	.500 " "
9.	Columbus (Importer "B")	1889,	.390 " "
10.	New York (" ")	1888,	.617 " "
		Duplicate,	.606 " "
11.	New York	1889,	.364 " "
12.	" " "Peeled"	1889,	.374 " "
13.	Cleveland	1889,	.420 " "
14.	" (Importer "A")	1889,	.370 " "

Third. Diameter 20 to 30 m.m., brown or few light brown, longitudinal wrinkles deep as in the preceding; fracture of roots short, seldom tough and woody, surface rarely mealy, usually resinous and horn-like; large, knotty and woody heads, with (few) short portions of stems formed a large part of all samples, except 15, 19 and 20.

15.	Cleveland	1889,	.776 % alkaloids.
16.	New York	1888,	.397 " "
		Duplicate,	.396 " "
17.	New York (Importer "C")	1889,	.310 " "
18.	" " (" "A")	1887,	.385 " "
19.	" " (" "C")	1888,	.485 " "
		Duplicate,	.476 " "
20.	Columbus	1889,	.227 " "

Ground and powdered, sold under label of grinder or of dealer.

GROUND.

21.	Cincinnati	1889,	.442 % alkaloids.
22.	Kansas City	1888,	.506 " "
23.	" "	"	.516 " "
24.	Indianapolis	"	.580 " "
25.	Chicago	"	.538 " "
26.	Philadelphia	1889,	.660 " "
27.	Indianapolis	1888,	.290 " "
28.	Boston	1889,	.495 " "
29.	"	"	.750 " "
30.	San Francisco	1888,	.454 " "
31.	" "	"	.558 " "

POWDERS.

32.	Kansas City	1888,	.525 % alkaloids.
33.	" "	"	.467 " "
34.	Philadelphia	1889,	.525 " "
35.	"	"	.243 " "
		Duplicate Assay,	.249 " "

Numbers 5, 10, 16 and 19 were collected by Prof. Painter in New York City. Of them he wrote: "These samples I believe to be a fair average of the New York market. Three of the four were obtained direct from the importers, and each was carefully selected as an average sample of a single importation of lots of 500 to 1,000 pounds. The sample from ——— ——— — —— (No. 16), is an average of the stock they had in hand purchased in this market." Number 5 is sufficiently different from the balance to require mention, inasmuch as it represents a supply that is very widely distributed, and is moderately constant in content of alkaloid. In substance it answers the description given for the first group, is free of stems and tough, knotty parts of the root, all pieces split, making a very light-colored, clean and attractive sample. But the proportion of alkaloid is only .365 per cent., being much below the value of a prime drug. Of it the importers say: "The belladonna root is an average fair sample of a 1,000 pound lot. We import it direct from a district where belladonna root is chiefly gathered." As nothing is known regarding the conditions of growth and time of collection, no comment can be made upon it, or upon any of the specimens.

In respect to size and appearance, most of the samples fall below the pharmacopœial description, but those answering it and appearing to have been taken from more mature and fuller-developed plants, contain an average of about .5 per cent. alkaloids, and would have exceeded this valuation much, if more carefully selected and free from lower portions of stems and woody or knotty parts of the roots.

In view of the variable quality of our supply, an authoritative standard of value in alkaloid, for the lower limit, at least, is very desirable.

For their prompt aid in securing material, it remains to acknowledge obligations to Messrs. Painter, Trimble, Patch, Bock, Cook, Mueller, Stahlhuth, Federmann and Buehler.

MR. CALVERT.—We had a discussion last night, which this paper will illustrate, I think, very clearly. It was with regard to accuracy in making preparations. I think this is a most instructive paper. I observe that two specimens of belladonna root were obtained in Cincinnati, in 1888, for the purposes of these experiments, one containing .220 per cent. of alkaloids, and the other .500 per cent., representing the ratio of 44 to 100. That is a very important fact, and, unless something is done in the way of making analyses of the finished preparations, all your accuracy about weights and measures is of very little avail.

Mr. Devine read the following paper:

HYPOPHOSPHOROUS ACID AND FERROUS SOLUTIONS.

Answer to Query No. 34.

BY JOHN DEVINE.

Soon after the last meeting of the American Pharmaceutical Association at Detroit, Professor Painter, the chairman of the Section on Scientific Papers, asked me to prepare an essay for this meeting, and the result of my work—the action of hypophosphorous acid (H_3PO_2) on ferrous solutions—is now submitted.

The experiments were commenced November 18th, 1888.

In order to ascertain the minimum quantity of H_3PO_2 that would act as a preservative agent, ten dozen one-ounce vials were labeled in duplicate, with consecutive numbers from one to sixty.

My reason for having them in duplicate was, that they might be placed at different temperatures, one of each number.

The hypophosphorous acid I had being insufficient in quantity, I thought of making some; but wishing to save time I sent to a wholesale drug house to get a 50 per cent. hypophosphorous acid, but could only obtain one of 10 per cent. To make myself certain of the strength, I took the specific gravity, and found it to contain only 5.80 per cent. of acid.

As I wished to use a concentrated solution, I carefully evaporated it by a water-bath at 120° F. until a 20 per cent. acid was obtained.

Of this acid, with a very fine burette, I placed nine minims in each of the vials marked No. 1; eight minims in those marked No. 2; seven minims in No. 3, and graduated so that No. 9 had only one minim of H_3PO_2 (see table No. 1).

After corking, the vials were set aside, and I made eighteen ounces of solution of iodide of iron of the same strength, and following the principal directions of the National Formulary, No. 216, page 74.

After filtering the solution and making up for loss, I carefully measured one ounce into each of the eighteen vials containing the H_3PO_2, and corked them while hot.

One part, numbered one to nine, was kept at a temperature of 70° F.; the other part, with corresponding numbers, at a temperature of 60° F.

As this lot was quite successful, I proceeded to make sixteen ounces of a stronger solution. The first lot contained 295 grains of iodine and 90 grains of iron to each fluid ounce. The second solution had 442 grains of iodine and 135 grains of iron to each fluid ounce, or one and one-half times the strength of the first lot.

I followed nearly the same lines as laid down in the N. F. in its preparation, and when completed measured one ounce into each of sixteen vials numbered, in duplicate, ten to seventeen, inclusive—each vial containing a specific quantity of H_3PO_2 (see table No. 2).

Being desirous of trying the H_3PO_2 with a weaker solution of ferrous

iodide, I then filled sixteen one-ounce vials with a solution of just half the strength of that of the N. F., and numbered them, also in duplicate, 18 to 25, inclusive (see table No. 3).

As I thought I had made sufficient of the ferrous iodide solutions, I determined to try the effect of various proportions of H_3PO_2 on solutions of ferrous chloride.

The first lot of the ferrous chloride solution was of the same strength as that of the National Formulary, No. 218, page 74.

I placed the H_3PO_2 in the vials—different quantities to each number in duplicate—and followed the directions of the N. F., in making the solution, except waiting till cold to make up the bulk, which I made up with hot water and filtered—and while still hot, measured it into the vials numbered in duplicate from 26 to 33, inclusive (see table No. 4).

As in the case of the ferrous iodide, I made another solution of ferrous chloride, following the same lines in making it as in the preceding lot, but one and a half times stronger than the N. F. directs (see table No. 5).

I also made a solution of ferrous chloride of half the strength of that of the N. F. (see table No. 6).

All the solutions of ferrous iodide and ferrous chloride were kept at different temperatures. One lot, numbered consecutively one to forty-nine, inclusive, was placed at a temperature of 70° F.; the other lot, numbered also from one to forty-nine, at a temperature of 60° F.

I examined them frequently to note any changes; but the following tables only record their appearance at the present writing (May 18, 1889), about six months after the commencement of the experiments.

TABLE No. 1a.—TEMP. 70° F.

Solution of Ferrous Iodide, same strength as N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
1	9 Minims.	Fine green color, well preserved.
2	8 "	" " " " "
3	7 "	" " " " "
4	6 "	" " " " "
5	5 "	" " " " "
6	4 "	Slightly paler than preceding.
7	3 "	" " " "
8	2 "	A slightly yellowish tinge.
9	1 "	Yellowish tinge a little more marked.

TABLE No. 1b.—TEMP. 60° F.

Solution of Ferrous Iodide, same strength as N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
1	9 Minims.	Fine green color, well preserved.
2	8 "	" " " " "
3	7 "	" " " " "
4	6 "	" " " " "
5	5 "	Slightly pale.
6	4 "	" "
7	3 "	Slight yellowish tinge.
8	2 "	" " "
9	1 "	Yellow.

TABLE No. 2a.—TEMP. 70° F.

Solution of Ferrous Iodide, one and one half times strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
10	10 Minims.	In fine condition, rich green color.
11	9 "	" " " " "
12	8 "	" " " " "
13	7 "	" " " " "
14	6 "	" " " " "
15	5 "	" " " " "
16	4 "	" " " " "
17	3 "	A very slight change.

TABLE No. 2b.—TEMP. 60° F.

Solution of Ferrous Iodide, one and one-half times strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
10	10 Minims.	In fine condition, rich green color.
11	9 "	" " " " "
12	8 "	" " " " "
13	7 "	" " " " "
14	6 "	" " " " "
15	5 "	" " " " "
16	4 "	A very slight change.
17	3 "	Change a little more marked.

TABLE No. 3a.—TEMP. 70° F.

Solution of Ferrous Iodide, half strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
18	10 Minims.	In good condition.
19	9 "	" "
20	8 "	" "
21	7 "	" "
22	6 "	Slightly paler than preceding.
23	5 "	" " " "
24	4 "	{ A slight yellowish color and dark ring on top. " " " with yellowish deposit.
25	3 "	Yellow, with yellowish red deposit.

TABLE No. 3b.—TEMP. 60° F.

Solution of Ferrous Iodide, half strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
18	10 Minims.	In good condition.
19	9 "	" "
20	8 "	" "
21	7 "	" "
22	6 "	Slightly paler than preceding.
23	5 "	Slight yellowish tinge.
24	4 "	Slightly yellowish, with yellow deposit.
25	3 "	Yellowish, with reddish yellow deposit.

TABLE No. 4a.—TEMP. 70° F.

Solution of Ferrous Chloride, same strength as N. F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
26	8 Minims.	In good condition.
27	7 "	" "
28	6 "	" "
29	5 "	" "
30	4 "	" "
31	3 "	" "
32	2 "	Slight change in color.
33	1 "	Change a little more marked.

TABLE No. 4b.—TEMP. 60° F.

Solution of Ferrous Chloride, same strength as N. F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
26	8 Minims.	In good condition.
27	7 "	" "
28	6 "	" "
29	5 "	" "
30	4 "	" "
31	3 "	" "
32	2 "	A slight change in color.
33	1 "	Change a little more marked.

TABLE No. 1a.—TEMP. 70° F.

Solution of Ferrous Iodide, same strength as N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
1	9 Minims.	Fine green color, well preserved.
2	8 "	" " " " "
3	7 "	" " " " "
4	6 "	" " " " "
5	5 "	" " " " "
6	4 "	Slightly paler than preceding.
7	3 "	" " " "
8	2 "	A slightly yellowish tinge.
9	1 "	Yellowish tinge a little more marked.

TABLE No. 1b.—TEMP. 60° F.

Solution of Ferrous Iodide, same strength as N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
1	9 Minims.	Fine green color, well preserved.
2	8 "	" " " " "
3	7 "	" " " " "
4	6 "	" " " " "
5	5 "	Slightly pale.
6	4 "	" "
7	3 "	Slight yellowish tinge.
8	2 "	" " "
9	1 "	Yellow.

TABLE No. 2a.—TEMP. 70° F.

Solution of Ferrous Iodide, one and one half times strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
10	10 Minims.	In fine condition, rich green color.
11	9 "	" " " " "
12	8 "	" " " " "
13	7 "	" " " " "
14	6 "	" " " " "
15	5 "	" " " " "
16	4 "	" " " " "
17	3 "	A very slight change.

TABLE No. 2b.—TEMP. 60° F.

Solution of Ferrous Iodide, one and one-half times strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
10	10 Minims.	In fine condition, rich green color.
11	9 "	" " " " "
12	8 "	" " " " "
13	7 "	" " " " "
14	6 "	" " " " "
15	5 "	" " " " "
16	4 "	A very slight change.
17	3 "	Change a little more marked.

TABLE No. 3a.—TEMP. 70° F.

Solution of Ferrous Iodide, half strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
18	10 Minims.	In good condition.
19	9 "	" "
20	8 "	" "
21	7 "	" "
22	6 "	Slightly paler than preceding.
23	5 "	" " " "
24	4 "	A slight yellowish color and dark ring on top. " " " with yellowish deposit.
25	3 "	Yellow, with yellowish red deposit.

TABLE No. 3b.—TEMP. 60° F.

Solution of Ferrous Iodide, half strength of N. F.

One ounce Vial of FeI_2 Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
18	10 Minims.	In good condition.
19	9 "	" "
20	8 "	" "
21	7 "	" "
22	6 "	Slightly paler than preceding.
23	5 "	Slight yellowish tinge.
24	4 "	Slightly yellowish, with yellow deposit.
25	3 "	Yellowish, with reddish yellow deposit.

TABLE No. 4a.—TEMP. 70° F.

Solution of Ferrous Chloride, same strength as N. F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
26	8 Minims.	In good condition.
27	7 "	" "
28	6 "	" "
29	5 "	" "
30	4 "	" "
31	3 "	" "
32	2 "	Slight change in color.
33	1 "	Change a little more marked.

TABLE No. 4b.—TEMP. 60° F.

Solution of Ferrous Chloride, same strength as N. F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
26	8 Minims.	In good condition.
27	7 "	" "
28	6 "	" "
29	5 "	" "
30	4 "	" "
31	3 "	" "
32	2 "	A slight change in color.
33	1 "	Change a little more marked.

TABLE No. 5a.—TEMP. 70° F.

Solution of Ferrous Chloride, one and one-half times strength of N. F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
34	8 Minims.	Fine green color, well preserved.
35	7 "	" " " " "
36	6 "	" " " " "
37	5 "	" " " " "
38	4 "	" " " " "
39	3 "	" " " " "
40	2 "	" " " " "
41	1 "	A very slight change in color.

TABLE No. 6a.—TEMP. 70° F.

Solution of Ferrous Chloride, half strength of N. F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE.
42	8 Minims.	The bright green color, when first made, has paled considerably. Otherwise there does not appear any change.
43	7 "	
44	6 "	
45	5 "	
46	4 "	
47	3 "	
48	2 "	
49	1 "	Very light green color.

TABLE No. 5b.—TEMP. 60° F.

Solution of Ferrous Chloride, one and one-half times strength of N, F.

One ounce Vial of $FeCl_2$ Numbered	Contains of 20% H_3PO_2	PRESENT STATE,
34	8 Minims.	Fine green color, well preserved.
35	7 "	" " " " "
36	6 "	" " " " "
37	5 "	" " " " "
38	4 "	" " " " "
39	3 "	" " " " "
40	2 "	" " " " "
41	1 "	Slight change in color.

TABLE No. 6b.—TEMP. 60° F.

Solution of Ferrous Chloride, half strength of N. F.

One ounce Vial of $FeCl_2$ Nnmbered	Contains of 20% H_3PO_2	PRESENT STATE.
42	8 Minims.	The bright green color, when first made, has paled considerably. Otherwise there does not appear any change.
43	7 "	
44	6 "	
45	5 "	
46	4 "	
47	3 "	
48	2 "	
49	1 "	Very light green color.

I have tried on two occasions ferrous solutions of different strengths with various solutions of hypophosphite of potassium—it being the most soluble of the hypophosphite salts—but found it utterly worthless. In fact, instead of retarding, it hastened a change very much.

I have also tried H_3PO_2 as a preservative agent in solutions of morphine and strychnine of different strengths. For contrast, I made solutions of equal strengths with chloroform water, camphor water and distilled water, of which the following tables show results:

TABLE No. 7.—TEMP. 60° F,

Showing the state of each solution of Morphine at the end of one month.

One ounce vial of solution of sulphate of morphine containing	Appearance with H_3PO_2	Appearance with chloroform water	Appearance with camphor water.	Appearance with distilled water.
1 grain.	No change.	No change.	No change.	No change.
2 grains.	No change.	No change.	No change.	No change.
5 grains.	Small flocculi.	Slight brown precipitate.	Slight discoloration.	No change.
10 grains.	Flocculi increased.	Slight brown precipitate and change of color.	Slight discoloration.	No change.
20 grains.	Flocculi increased and yellow tinge.	Precipitate and change of color more marked.	Discoloration and brown deposit.	Slight flocculi.
30 grains.	Yellow tinge and deposit of crystals.	Yellowish color and formation of crystals.	Brown deposit and crystals.	Slight discoloration and deposit of crystals.
32 grains.	Yellow tinge and deposit of crystals.	Yellowish color and deposit of crystals.	Brown deposit and crystals.	Slight discoloration and deposit of crystals.

TABLE No. 8.—TEMP. 60° F.

Showing the state of each colution of Strychnine at the end of one month.

One ounce vial of solution of sulphate of strychnine containing	Appearance with H_3PO_2	Appearance with chloroform water.	Appearance with distilled water.
1 grain.	No change.	Slight flocculi.	No change.
5 grains.	Slight flocculi.	Slight flocculi and slight brown deposit.	No change.
10 grains.	Slight flocculi.	Brown deposit increased.	Formation of crystals.

From tables 7 and 8 it will be seen that H_3PO_2 is of no value in preserving solutions of morphine and strychnine—distilled water, in each case, being superior.

The next question is, what becomes of the hypophosphorous acid in the solutions of ferrous iodide and ferrous chloride? It is undoubtedly a powerful agent in preventing oxidation in those solutions: but what role does it act? what combination does it form? or what reasons can be adduced for this acid in preventing oxidation or change? This is a difficult question to answer. 'Tis true we can give equations by chemical formulæ showing reactions; but none of these equations are, to me, satisfactory.

I believe, however, that hypophosphorous acid, by combination, forms an acid ether, called phosphinic acid, which, permeating the solution, prevents molecular change.

Contrary to my expectation, I find that the solutions kept at 70° F. turned out better and brighter than those kept at 60° F.; and also, that concentrated ferrous solutions kept best—even with a relatively smaller quantity of H_3PO_2.

If they are to be kept for a long time, no doubt highly concentrated ones are best; but, while saying this, I believe that the strength and working formulas in the National Formulary are more practical, and, if prepared with ordinary care, will keep without change for six months or more. If due precaution is used in corking, and the solution kept in small bottles, perhaps a smaller quantity of acid might be used; but, for practical purposes, the formulas of the National Formulary are all that can be desired, and cannot well be improved upon.

On motion of Mr. Hallberg, a vote of thanks was extended to Mr. Devine.

MR. MAISCH.—I should like to ask this question, whether it is necessary to preserve the officinal solution of ferrous iodide by some reducing agent? I have not of late years made any experiments, but my experience has been that I had no difficulty in keeping it without adding anything at all except the sugar that was used in preparing it.

MR. DEVINE.—This was simply a solution of the ferrous iodide.

MR. MAISCH.—Was it necessary for the officinal syrup to add something in addition to the sugar?

MR. EBERT.—My experience is that the syrup of iodide of iron is not much more stable that it was formerly. The fact is that the cane sugar which is used to preserve it is oxidized at the expense of the ferric iodide. That difficulty has always existed when cane sugar is used. Other preservatives that have been recommended I believe simply prevent this. My own experience has been this, that when cane sugar syrup was partly inverted, then the syrup of iodide of iron would remain permanent. I have had several such experiences—for instance, that in the operation some accident would happen; then by boiling for some length of time, and finishing the syrup, it would be permanent; but when absolutely pure cane sugar was present, in a very short time the change would

take place when exposed to the air. Experiments have been made to use a certain proportion of glucose, and to convert the cane sugar into invert sugar, and then the solution of ferrous iodide will remain permanent.

MR. MAISCH.—That is exactly the point. I have made syrup of ferrous iodide in very large quantities. The practice has generally been to prepare a very dense simple syrup, which had to be kept liquid at an elevated temperature, and into that concentrated simple syrup there was filtered a warm solution of ferrous iodide. Made in this way I have never found any difficulty in keeping it. The manipulation, I believe, was first suggested by Dr. Squibb. I have kept the syrup for months, I might say for years, sometimes in half filled vials without any cork in them, and I have noticed but very little change in it. I attribute this to the transformation of the cane sugar into invert sugar.

MR. REDSECKER.—We have had no trouble in keeping syrup of iodide of iron for a number of years. After making our syrup of iodide we add a half drachm of hypophosphorous acid to the gallon. We pour out into the dispensing bottle as we want, and we are not particular whether the air gets to it or not. The syrups keep in a nice condition for months. Heretofore we had trouble, but for about four years I have used hypophosphorous acid, and now the solution will keep two years in a corked bottle very nicely. The solution of ferrous iodide is poured into a simple syrup, then the hypophosphorous acid is added, and I have no trouble in keeping the syrup,

MR. RAY.—We have had no trouble with it since keeping the solution in stock. We keep it in the dispensing case, and without precautions have no trouble. As a matter of curiosity I have made a solution of iodide of iron in a common pot without any precautions whatever, and it keeps perfectly.

THE CHAIRMAN.—How is that preserved?

MR. RAY.—With a little hypophosphorous acid: I don't know the exact quantity. The physicians who use it don't object to it. There cannot be any difference in effects at all, really, of the preparation, and it solves the question of the difficulty in keeping syrup of iodide of iron.

MR. MAISCH.—I did not speak of that, Mr. Chairman, with the intention of hinting even that it was wrong to add hypophosphorous acid: I merely mentioned the fact that without the use of hypophosphorous acid there need be no difficulty in preserving syrup of ferrous iodide, and this appears to me to be solely due to the manner in which it is originally prepared. The manner in which the hypophosphorous acid appears to act for an indefinite period I must confess is a mystery to me, and I am greatly obliged to Mr. Devine for the suggestion which he makes in the paper. I hope that he may succeed in proving that such a transformation into an ether may possibly account for the stability.

MR SEARBY.—If Mr. Ebert's idea be the correct one, it may be possible that the hypophosphorous acid may have the effect of inverting some of the sugar. Some years ago Prof. Wenzell was experimenting upon this subject, and he told me then that his experiments, so far as he had conducted them, showed some compound formed by the elements of the sugar and the iodine.

Mr. Whelpley read a paper in answer to Query 48 by Dr. Stewart, which properly belongs to, and should have been read before, the Section on Commercial Interests.

ON PATENT AND TRADEMARK LAWS.

QUERY 48.—What is the policy of the Patent and Trademark Laws in relation to the science of medicine and the useful arts ofPharmacy and Therapy?

BY F. E. STEWART, M. D., PH.G., WILMINGTON, DELAWARE.

INTRODUCTION.

I have undertaken to answer this query with no little trepidation, owing to the great importance of the subject and its technical nature. It is a question that not only affects pharmacy and medical science, but embraces questions of law concerning which even good lawyers often differ—questions of national and international importance.

In the year 1872 I entered the drug store of Messrs. H. C. Blair's Sons, Philadelphia, for the purpose of studying pharmacy. I spent four years with the Blairs, and graduated from the Philadelphia College of Pharmacy in the "Centennial Class," the class of 1876.

When I stepped from the platform of the Academy of Music, with my diploma in hand, I supposed myself a member of one of the liberal professions.

I now went to New York, and took charge of Hunter's pharmacy, on Sixth Avenue, determined to obey the injunctions of the Faculty, to devote my life to the cause of science, the profession, and suffering humanity, as becomes a member of a liberal profession.

Finally, as Hunter's pharmacy was to be sold, I accepted, temporarily, the position of chemist and general superintendent of the Hemry T. Helmbold Buchu Manufacturing Company, with the proviso that some pharmaceutical specialties of my devising should be placed upon the market. This arrangement eventuated in the establishment of the firm of F. E. Stewart & Co., manufacturing chemists.

While in the employ of the Helmbold Company I learned for the first time that the system known as the "patent" or "proprietary" medicine business is a misnomer; that medicines are rarely patented, but are protected under the trademark law, or are supposed to be so protected, and that the pharmaceutical specialty business depends on a similar use of (or abuse of) trademarks to prevent competition. In other words, I found that the "patent" medicine business and the pharmaceutical specialty business are identical in principle, only the former creates a demand by advertising directly to the public, and the latter by appealing to the medical profession and relying upon physicians' prescriptions to create the demand. I had consented to superintend the Buchu Company until the firm of F. E. Stewart & Co. could be established, expecting then to resign and confine myself to what I, in my innocence, considered legitimate pharmacy; and my surprise was great when I found that said firm, instead of being engaged in legitimate pharmacy, was only in another branch of the "patent" medicine business. Disgusted, I dissolved the

firm and went back to Philadelphia, where I graduated from the Jefferson Medical College in 1879.

It was still my idea, however, to devote myself to pharmacy, not expecting to practice the art, but to investigate the science and publish the results of my work in medical literature. My first investigations were commenced before taking the degree of M. D., and were published in the form of an inaugural essay, entitled "A New Method of Rectal Medication," For this thesis I received honorable mention from the Jefferson faculty. It introduced to science the rectal gelatin capsule as a substitute in some cases for the butter of cacao suppository.

My next investigation resulted in the introduction of sanguis bovinus exsiccatus, or desiccated bullock's blood, a description of which may be found in the fifteenth edition of the United States Dispensatory.

The introduction of both of these articles cost me time and money. I gave them freely to the professson, and have never received any remuneration therefor, except in reputation. And as for reputation, doubtless but few who use the desiccated blood know I introduced it; and as for the rectal capsules, though they are now employed quite extensively, I doubt whether ten physicians in a hundred are acquainted with the fact that I deserve the credit of inventing them.

Because pharmacy is regarded, not in the light of a profession, but as a trade, those who devote themselves to scientific work in this field of medicine usually receive little credit from the medical profession, except it is certain that they are not interested in the manufacture and sale of medicines. In fact, everything that comes from what is called a trade source is regarded with suspicion. When I took my paper on a "New Method of Rectal Alimentation" to the editor of the *New York Medical Record*, the first question he asked was, "Are you interested in the sale of desiccated blood?" When I assured him that I was not, he published the article. In case I had been, then my article would have been regarded in the light of an advertisement, to be put in the advertising columns, and well charged for. When a physician reports the results of his treatment of a case in which he is monetarily interested, no such question is asked. It is not only considered his privilege, but his duty, to report his experience for the benefit of the science of therapy. Why should pharmacy be denied a representation in medical literature? Is the science of preparing medicines any less a branch of medical science than the science of applying them to the cure of the sick?

I was not long in discovering, however, that a notable exception was made in the case of one prominent pharmacist, for everything he wrote readily found a place in medical literature. I refer to Dr. E. R. Squibb, manufacturing pharmacist, Brooklyn. I concluded finally to consult this gentleman for the purpose of finding out why he could secure a publication for scientific articles concerning pharmaceutical preparations in the sale of which he was interested, while others could not.

Dr. Squibb received me very kindly, and when I stated my errand, invited me into his private office for an hour's chat. Here I learned fully the difference between legitimate pharmacy and proprietary pharmacy. Briefly described, I found Dr. Squibb's policy to be this, viz:

He claimed no proprietorship whatever in any article of his manufacture. Squibb's fluid extract of ergot is not so labeled. It is the regular fluid extract of the Pharmacopœia, manufactured by Squibb. Neither is it Squibb's ether, but the regular ether of the U. S. Pharm., manufactured by Squibb. In other words, Dr. Squibb claimed nothing except that he manufactured standard preparations that any one might make, and that others were making, only he employed the greater skill and care in the selecting of drugs and their manipulation. When he introduced a specialty, it was provided with a name under which others had an equal right to manufacture and sell it; and for the purpose of promoting progress in the science and art of pharmacy, he always published the exact working formula, whereby all could manufacture the same article. He never advertised in the journals, but finished the results of his investigations in the form of scientific articles. This, to be sure, brought him prominently into notice, and created a demand for the preparation written about. But the demand was a legitimate one, founded on the merits of the medicine thus advertised, and, in relation to advertising in this way, it was a legitimate outcome of scientific work by which everybody profited alike. His work was, therefore, for the benefit of science, of the professions of pharmacy and medicine, and of suffering humanity. He was not a tradesman, but a member of a liberal profession, and as such could not be denied the rights and privileges belonging to his class.

Dr. Squibb said that the manufacturers of proprietary medicines of all kinds rely on the demand created by advertisements, and not on the publication of the results of scientific work. He called the advertising system, as then carried on, a system of fraud, error, humbug and lies. It consisted of garbled quotations and one-sided statements. The failures to cure were never reported, and the successes were related in a florid style for the purpose of selling goods. "This method of advertising," he said, "creates an artificial demand for medicines. Hosts of new remedies, unsupported by sufficient testimony, are forced upon the market in this way, and a demand is created for them by advertising, either directly to the public, in the secular press, or by advertising in the medical journals and depending upon physicians' prescriptions to create the demand. The result is, that not only are professional interests seriously injured thereby, but the American people are noted for taking more medicine than any other nation in the world."

Furthermore, the proprietary pharmaceutical manufacturers are attempting to teach the medical profession therapeutics. The teaching of therapeutics is outside the province of pharmacy in the first place, and

the therapeutics taught by these houses is of a very questionable quality. Pharmacists have no business in this field of work. They should leave the business of treating the sick, or of investigating the therapeutic action of drugs, in the hands of the medical profession, where it belongs.

I now fully understood why it was that pharmacists were not welcome contributors to medical journals. It was the proprietary medicine business that stood in the way. I therefore determined to attack the system, not so much for the purpose of demolishing it—I hoped for no such desirable result—but for the purpose of drawing a clear line of demarkation between the practice of legitimate pharmacy and the proprietary medicine trade, hoping to secure a place for pharmacy in medical literature, as part of the science of medicine, where it belongs.

But I could not have taken up an investigation more unpopular to the medical journals, who feared injury to their advertising patronage, to manufacturers, who feared the retail drug trade would compete with them as soon as the druggists found they could do so with impunity, and to other interests who were getting rich at the expense of scientific medicine by favoring the scheme. After trying in vain to get the journals to take hold of the matter, I nearly despaired. Fortunately, I became acquainted with a manufacturing house in Detroit, now well known throughout the world, that were also interested in the subject. This house had already attempted to bring the matter before the American Medical Association, and failed in securing a hearing. It now consented to make another trial, so we joined forces and have been working together ever since. One by one the journals have seen the wisdom of the effort, and are now on our side. One of the first to fall into line was the *Chicago Pharmacist*. The *Medical and Surgical Reporter* kindly took the matter up, but could not induce others to follow, though its editor called it "The Question of the Day." Finally, the *Druggists' Circulur* opened with its big gun, and its strong utterances have done much to open the eyes of all. I make no complaints against either the journals or the manufacturers. Many of the editors, though they differ with my views, are warm personal friends, and the same is true of many among the manufacturers. I expect to see the time when all will admit the justice and wisdom of our position, however, and pharmacy will rise triumphant from her bonds.

HISTORY OF THE COPYRIGHT WAR.

On investigating the proprietary system, I found that the principle underlying it is not a new one, and the question it involves has been the *casus belli* in several bitter though bloodless battles in what is called the "copyright war." If you will kindly turn to the article on "copyright" in the "Encyclopædia Britannica," you will see that there has for many years been waged a bitter warfare on the question whether an author has a natural right to the exclusive use of his writings so that he may prevent others from copying them, or whether a copyright is only a

thing of statute. "The nature of the right itself and the reasons why it should be recognized by law have been from the beginning the subject of a bitter dispute. By some it has been described as a monopoly, by others as a kind of property. As a monopoly, it is argued that copyright should be looked upon as a doubtful exception to the general law regulating trade, and should at all events be strictly limited in point of duration. As property, on the other hand, it is claimed that it should be perpetual. Historically, and in legal definition, there would appear to be no doubt that copyright, as regulated by statute, is a monopoly."

The authority for the patent and copyright laws of this country is derived from the Constitution of the United States, which says, "To promote progress in science and useful arts by securing to authors and inventors for limited times the exclusive use of their respective writings and discoveries." See Art 1, sect. 8, clause 8. And the same question that excited so much debate in the House of Lords was argued by the United States Supreme Court. I quote again from the Encyclopædia Britannica: "In 1834 was contested in the Supreme Court of the United States the same question which had been so elaborately argued in the English case of Miller *vs.* Taylor, and finally settled by the House of Lords five years later in Donaldson *vs.* Becket, viz.: Whether copyright in published works exists by the common law, and is therefore of unlimited duration, or is created by and wholly governed by statute." The Supreme Court, following the authority of the House of Lords, held that there was no copyright except for the limited term given by the statute. That judgment has continued since to be the supreme law.

NATURE OF THE PATENT OR COPYRIGHT PRIVILEGE.

Simond, in speaking of the nature of a patent privilege, says: "Many, and perhaps the great majority of inventors, have incorrect ideas of the nature of a patent privilege. Starting from false premises, they reason wrongly about various questions that arise, and are never able to comprehend why laws read as they do, or why the courts make certain constructions of the laws. A correct conception of the nature of a patent grant, and of the reasons upon which the patent law is based, will do much to clear up the difficulties of this nature which often beset inventors. The belief is very generally entertained, that inventors have a natural right to their inventions, of the same kind given by the statutes, irrespective of the actual passage of the law.*

"Such is not the fact. The right to the exclusive use of an invention is not a natural right—that is, pertaining to a man in a state of nature; but, when it exists at all, is a civil right, pertaining to man under the protection of a civil government.

"All will concede that one natural right of a man is, to have an equal

* Traité des Brevets d' Invention: Par C. Renouard. Phillips on Patents.

chance with his fellows to gather and amass the goods of this world. Suppose two men, under the protection and control of no human government, to be occupying and cultivating tracts of land side by side. For years they plow, sow, and reap in the same manner and with the same rude tools. Finally one of them invents a plow, with which he can cultivate twice as much land in the same time as before, and do it better. There is no principle of natural justice which forbids the neighbor, upon seeing how well the plow works, from making and putting to use one like it. The doing so by the neighbor does not injure the inventor in any possible way. If the neighbor has not the right to make and put to use a plow like the inventor's, he is shut off from an equal chance with the inventor of amassing wealth, and this when his hinderance is no help to the inventor.

"Not only this, but the neighbor at the time the inventor made his plow, might have already begun to ponder upon the poor work done by the old plow, and set about making a better one, and would have soon invented the new plow himself, and thus acquired as good a title to the exclusive use of it as the prior inventor—a use, however, from which he would be debarred by a person having no better title than himself, a thing that would be clearly unjust.

"The last is by no means a merely suppositious case, for patent solicitors and patent office examiners well know that the same inventions are made over and over again by independent inventors. The writer has had a great many personal proofs of this assertion. The frequency with which this is done would be most surprising, were it not for another and a recognized fact, that the mind is governed by laws of action just as much as the body; so that, given a certain invention to produce, and two minds of similar knowledge and habits to produce it, they will be quite likely to travel through the same road to the same result.

"An inventor has no right to his invention at common law. He has no right of property in it originally. The right which he derives is a creature of the statute and of grant, and is subject to certain conditions incorporated in the statutes and in the grants. If to-day you should invent an art, a process or a machine, you have no right at common law, nor any absolute natural right, to hold that for seven, ten, fourteen, or any given number of years, against one who should invent it to-morrow, without any knowledge of your invention, and thus cut me and everybody else off from the right to do to-morrow what you have done to-day. There is no absolute or natural right at common law, that I, being the original and first inventor to-day, have to prevent you and everybody else from inventing and using to-morrow or next day the same thing.*

"Another reason that militates against the theory that an inventor has

* 1 Am. H. & L. S. & D. Mach. Co. *vs.* Amer. Tool & Mach. Co., 4 Fisher's Pat. Cases, 294.

any natural exclusive right to his invention, is that, in a state of nature, he would have no power to enforce his rights. In theory, his every neighbor is as strong as he, and combined they are much stronger. It may be urged that, as the inventor confers a benefit on his neighbor, by giving him knowledge of the invention, the neighbor is bound, in common justice, to make return therefor. The principle is no stronger than the one that the inventor is bound, in common justice to his fellow men, to permit them an equal chance with himself to amass wealth, when doing so entails no injury on himself.

"If an inventor has a natural exclusive right to his invention for one moment, he has it forever; and, if any limit of time can be set to such a right, only infinite wisdom is adequate to so delicate a task. To state the doctrine of natural right thus, is to show that it does not exist. The law has never recognized the doctrine of natural right, for it cannot recognize what does not exist."

POLICY OF THE PATENT LAW.

What, then, is the policy of the patent law? In answer to this question, let me quote again from the same authority:

"The policy of the patent law is, primarily, a selfish one on the part of the public, and only secondarily intended for the benefit of inventors, and then as a means to an end only. The Constitution of the United States gives Congress the power 'to promote the progress of science and the useful arts, by securing for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries, thus showing, in this fundamental legislation, that the object sought is a benefit accruing to the public.'*

"The theory of the law is, that the promotion of science and the useful arts is of great benefit to society at large, and that such promotion can be attained by securing to inventors and authors, for limited times, the exclusive right to their inventions and writings. That such theory is correct, is needless to say. It is almost self-evident, or at any rate readily susceptible of proof, that the magnificent natural prosperity of the United States of America is directly traceable to wise patent laws and their kindly construction by the courts.

"The patent laws promote the progress of the useful arts, in at least two ways: first, by stimulating inventors to constant and persistent effort in the hope of producing some financially valuable invention; and, second, by protecting the investment of capital in the working and development of a new invention till the investment becomes remunerative.

"A patent is a contract between the inventor and the government representing the public at large: † the consideration moving from the in-

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* Day *vs.* Union Rubber Co., 3 Blatch, 500: Randall *vs.* Winsor, 21 Howard, 327.

† Ranson *vs.* N. Y., 1 Fisher's Pat. Cases, 252.

ventor is the production of a new and useful thing, and the giving to the public of a full knowledge thereof by means of a proper application for a patent, whereby the public is enabled to practice the invention when the patent expires. The consideration moving from the government is the grant of an exclusive right for a limited time, and this grant the government protects and enforces through its courts."

WHAT IS A TRADEMARK?

Browne, in his excellent treatise on trademarks, says: "The proprietary instinct is an implantation of nature. The claim to property is asserted by means of symbolism. A man may be permitted the free use of an estate; but his enjoyment of it must necessarily be imperfect unless his title be attested by the symbolic marks borne upon the title deed. Upon the genuineness of these marks, consisting of words, signatures, and seals, depends his faith. If any of those signs prove to be false, the absolute right to the property is illusory. Who would purchase even a toy for a child without feeling that he was being dealt with in good faith? He desires a particular article, the make of some special manufacturer. He glances at a mark upon the thing offered. It is sufficient, it has a peculiar sign upon it. Faith guides him. The same faith has governed men in their commercial transactions through all past years, and must continue to do so for all future."

Again: "Such emblems had their origin in a general ignorance of reading the combinations of cabalistic characters that we call writing * * * * a simple emblem, as a crescent, a sun, a star, an animal, or other object copied from nature or devised by fancy, when once associated with a particular class of goods, or the handicraft of a certain man, would be readily understood. * * * Faith, the very soul of commerce, thus gave mutual advantages. The maker was protected against unfair competition of inferior workmen, and the purchaser had a guarantee of excellence. The mark was as easily read as were the marks that distinguished the cattle of Jacob from those of Laban. It spoke an emphatic language: When you see me, know that I come from so and so. From the day that such signs were used by artisans to indicate the product of their skill, or by merchants to vouch for the honesty of commodities sold or traded by them, base imitators must have existed, for dishonesty is not the junior of art. He who could forge a piece of metal could also forge a symbol: thence arose the necessity for restrictive laws and retributive penalties."

Again: "Seals are the most sacred of proprietary marks; and from early antiquity they have been used. The seal has ever been a distinguishing mark of ownership, of security as in the case of sealing the den of lions upon Daniel, and the door of the sepulchre wherein was laid the body of the Saviour; of affection as in the language of the church to her Lord in the Song of Solomon: Set me as a seal upon thy heart, as a

seal upon thine arm;' of honor, of secrecy, of attestation, of authenticity."

The author also refers to the seals of heraldry, and he says: "Heraldry may be regarded as a science, insomuch as it possesses a system, a classification, and a language of its own,—which language speaks forth in many a hundred trademarks." He goes on to say that in this work on the use of trademarks in commerce the trademark is regarded as a token of proprietorship and authenticity. "whether as a sign, a word a brand,—in all cases the legal significance is the same: a brand (from the Anglo-Saxon, *brand*, to burn) is a seal of ownership imprinted on casks or other wood-work, with hot iron, derived from the custom of burning criminals with heated metal."

"It is an indisputable fact that in all ages of the world, and among all races of men, some form of symbolic expression has been in use and favor. It was the badge of good faith. *Caveat emptor*—let the purchaser beware: see that the seal is on the bale of goods, the marks are on the fabrics."

The Chinese had a priority of 1600 years over the invention of European porcelain; yet we find proofs of their trademarks. These are of two sorts: one kind is composed of Chinese characters, which tell under what reign the article was made; the other by design in color, or engraved names of men, or of establishments, indicating the author of a vase, the place of manufacture, or the destination of the article, as for the use of the emperor or other dignity. "On a piece of pure white china of great antiquity there was found stamped a factory mark."

Aldus Manutius, the famous Venetian printer, adopted the dolphin and anchor as his mark. In 1503 the olive tree was the sign of Henry Estienne, a bookseller and printer, etc. Time will not permit a further enumeration of the various factory marks or trademarks that have been used.

WHAT THE TRADEMARK INDICATES.

Now a trademark is for the purpose of indicating two things: 1. *Ownership.* 2. *Source or origin.* "The Supreme Court of the United States, in President, etc., of the Del. and Hudson Canal Co. *v.* Clark, repeated a proposition that as a rule has been frequently enunciated and settled beyond question, viz., the office of a trademark is to point out distinctively the origin or ownership of the article to which it is affixed, or in other words, to give notice who was the producer."*

Trademarks are branded on cattle to indicate to whom they belong. Suppose all the cattle in the world belonged to one man, what would be the use of his branding them? There would under such circumstances be no danger of any one confusing his cattle with cattle belonging to others. Why would he use a distinguishing mark? Trademarks are branded on

* Patent Office Official Gazette, March 26, 1872.

vases to indicate from which pottery they come. Suppose there were only one pottery in the world, what were the use of a distinguishing mark? Trademarks are placed on pens, ink, paper, cotton, cloth, silk, etc. Suppose each of these articles to be made by one and only one manufacturer respectively, what would be the sense of marking them with a sign to show from which factory they emanated? Trademarks are of no service whatever, unless there are two or more of a kind. A trademark is a mark or device used by a manufacturer on his goods to distinguish them from similar articles on the market. There are several hundred furnaces in the world manufacturing iron. To distinguish from which furnace a certain piece of iron came, look at the factory or trademark. Hundreds of manufacturers of silk exist, but the make of each factory can be distinguished by the trademark.

There is no good reason why a patented article should be marked with a trademark, for reasons just stated. The telephone is patented, and the patent is controlled by Mr. Bell. Why should he mark a sign on his telephones to distinguish his telephones from the telephones of other manufacturers, when he has a monopoly of telephone making? The idea is absurd. Yet we hear medicine manufacturers claiming that they have a monopoly for the manufacture of their medicines, because they have marked their trademarks upon them. As well might a silk manufacturer claim a monopoly of the silk trade of the world for a similar reason.

Now, as a trademark has no other function than the ones just named, that is to indicate ownership or origin, it follows that any attempt to use it for other than the purposes intended is illegal.

A NEW USE FOR THE TRADEMARK, NEVER INTENDED BY LAW.

As I have already said, there are those who believe that inventors have a natural right to the exclusive use of their inventions irrespective of the law, and of course believe that their right is perpetual. As the patent law only permits a limited monopoly, those of this persuasion do not desire to patent their inventions, and thus part with what they consider their property at the expiration of the time fixed by the patent law. At the same time, they are very desirous of legal protection. They have accordingly devised a scheme to secure perpetual monopolies by registering the names of their inventions as trademarks; and as a trademark is a thing of natural right and common law, and the perpetual property of the owner, it follows that the ownership of the names of inventions is thus made the perpetual property of the inventors, and competition is restricted or entirely prevented in consequence. *The trademark is thus made to serve a new function, clearly never intended by law.*

ILLEGAL USE OF TRADEMARKS.

To explain more fully: The courts have decided that "when an article is made that was theretofore unknown, it must be christened with a name

by which it can be recognized and dealt in; and the name thus given it becomes public property, and all who deal in the article have a right to designate it by the name by which alone it is recognizable."*

Let me illustrate. Bessemer devised a new method of making steel. Steel made by this method has become known as Bessemer's steel. Steel made in this way was theretofore unknown. Under the name Bessemer's steel by which it was christened, it is now recognized and dealt in. The name has become public property, and all who deal in the article have a right to designate it by this name.

Of course until the patent ran out (I believe it has expired, at any rate whether it has or not does not effect my illustration), Bessemer owned the exclusive right to make the steel; but as soon as the patent expired the public had as much right as he to manufacture the article and call it Bessemer's steel. And if Bessemer had not patented his process, the public would have had an equal right in the beginning to manufacture the invention and call it Bessemer's steel.

Now suppose Bessemer, when he devised his process for making steel, had registered the name "Bessemer's steel" as a trademark on steel, could he have held his name used in this connection for the purpose of creating a monopoly in this kind of steel. Suppose that he could, then:

1. The trademark would in such case acquire a new function and one never intended by law, viz.: the holder would acquire a kind of patent privilege.

2. As the inventor has no natural right, or right at common law, to the exclusive right of his invention, the public possesses an equal right with the inventor to the manufacture and sale of the invention. If the inventor in this case had prevented others from making and selling this kind of steel under the name by which it was known to the public, then he would have obtained an unfair advantage over his competitors.

3. The name Bessemer's steel has become part of the common language, and descibes a thing that the public have a right to. An attempt to wrest this right from the public would evidently be unfair.

Just such cases have frequently happened and have been decided by the courts.

"The name of a man may lose the idea of personality, and become a mere indication of quality. This point was decided by the Court of Cassation, the supreme judicial tribunal of France, in the case of Stubbs *v.* Astier et als., 1865.† The plaintiff, a manufacturer in England, brought suit to restrain the use of his name upon articles of merchandise made and sold in France. It was contended on one side that the name of Stubbs had lost its primary use, which was to indicate certain articles of hardware and cutlery as being his manufacture, and that by long use

* Leclanche Battery Co., *vs.* Western Electric Co., 23 Fed. Rep., 277.

†Annales de la Prop., Tome. xi, p. 81.

it had acquired a new attribute, and that to hold otherwise would be to take away rights that had become vested in the French people. On the other side, it was strenuously contended that a man's name is his distinct property, and remains a property sanctioned by the law of nations; and although the mark attached to it had fallen into the public domain from any cause, the name did not cease to be the exclusive property of him who bore it." It was decided, however, that the name no longer indicated the origin, but the nature of the product — that the name had been turned to another than the original purpose, and therefore could not be a trademark.

"In the case of Bournhouet & Basille (successors of La Maison Ternaux) *v.* Tisseron et al.,* in the Court of Cassation, in 1869, we have an instance in point. It was held that the successor of a merchant cannot prevent another merchant from using the name of his predecessor to designate the products of their fabrication, when the name has long been used as the designation of a certain kind of products manufactured by the generality of the trade, and which has thus become public property as a quality term—a mere adjective. It is especially so in the employment of the name of Ternaux to designate a certain kind of broche shawls."

"The case of Singhton *v.* Bolton,† before Lord Mansfield, in 1873, is an illustration of the doctrine that a man's name may become a mere qualifying word. The plaintiff's father sold a medicine called "Dr. Johnson's Yellow Ointment." The plaintiff, after his father's death continued to sell the medicine, marked in the same way. The defendant also sold the medicine, with the same mark ; and for that alleged injury an action was brought. The plaintiff was non-suited. A rule having been obtained for a new trial, Lord Mansfield said that if the defendant had sold a medicine of his own under the plaintiff's name or mark, that would be a fraud, for which an action would lie. But here, both the plaintiff and defendant use the name of the original inventor, and no evidence was given of the defendant having sold it as if prepared by the plaintiff. The only other ground on which the action could be maintained was that of property in the plaintiff, which was not pretended, there being no patent."

"We have familiar instances of a person's name becoming a mere indication of a certain article or class of goods. Wellington, Brougham, Stanhope, Blucher, and Manton are personal names that have given us the Wellington boots, the Brougham or the Stanhope carriage, the Blucher boots, and the Manton fowling piece."‡

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*Annales de la Prop., Tome x. p. 197.

†3 Doug., 193.

‡Browne on Trademarks, 122.

POLICY OF THE PATENT AND TRADEMARK LAWS WHEN APPLIED TO PHARMACY AND THERAPY.

It is evident after what has been said that the policy of the patent and trademark laws, when applied to medicine and pharmacy, is to promote progress in medical science, and the useful arts of pharmacy and therapy. It is intended that those who discover new and useful inventions to relieve human suffering shall be rewarded by the exclusive use of their inventions for limited terms in exchange for a publication of full knowledge thereof whereby other physicians and pharmacists may be enabled to manufacture them when the patents expire. It is intended that capital invested in the making and marketing of medical inventions, shall be protected until such investments shall become remunerative ones. It is intended that each manufacturer shall have his distinctive mark, trademark or commercial signature, whereby the public may distinguish preparations made in his laboratory from the same preparations made in the laboratory of another. It is intended that the public shall be benefited by the impetus given by these laws to progress in science and trade, and be protected from imposition and fraud. Provided all these intentions are carried out, and such a beneficent policy is maintained, the application of the patent and trademark laws to medical science and its associated arts is a benefit to all concerned.

THE PATENT MEDICINE BUSINESS.

We have in this country what is known as the "patent" medicine business. It claims protection under the patent and trademark laws. For a long time this business was divided from pharmacy and medicine, and constituted a kind of outside trade. It was condemned alike by physicians and pharmacists. During late years it has extended its field and encroached on the ground of both professions. Now it has grown to such dimensions, and assumed guises of such respectability, that members of both professions are actively interested in it. It has, to a great extent, absorbed pharmacy, and the manufacture and sale of medicines is now carried on under the system so largely that nearly every new invention in pharmacy and therapeutics is marketed under its protection.

The "patent" medicine business is not conducted under the scientific system of the patent law, as the name implies. The name is, in fact, a misnomer. Its system is one of secrecy and perpetual monopoly.

This is the way the thing is worked. A new preparation is devised, or a compound of old and well known drugs is mixed, and a name is invented by which to designate the compound. This name is registered as a trademark at Washington, the true or working formula of the preparation is kept secret, and the preparation is marketed under the alleged protection of the trademark law. Then the advertising machinery is started into operation, and great claims are made in regard to the mar-

velous therapeutic value of the new and wonderful alleged invention. As it takes years to prove whether a new therapeutic agent is really of any special value, these claims are just as likely to be incorrect as true, and often turn out downright imposition. By this system knowledge is concealed, progress in science and art hindered, error inculcated, and the public injured instead of being benefited. While the correct application of the patent and trademark laws to medical science and arts may be excellent in its effects, too much condemnation cannot be indulged in regarding this form of charlatanry known under the incorrect appellation "the patent medicine business."

The tendency of the proprietary system, as it is sometimes called, is well illustrated by the following cases:

THE TONGA CASE.

"Tonga is a compound of barks prepared by the natives of the Fiji Islands, and has borne in that locality for years the reputation of being an effective remedy in the treatment of neuralgia. A quantity thereof was brought, as alleged, to London in the year 1879, by one Mr. Ryder, who placed the same in the hands of Allen & Hauburys, druggists, London, in order that it might be introduced properly to the medical profession. The first information relative thereto which was published to the public or to the medical profession, appeared in the shape of an article in the *London Lancet*, March 6, 1880, pp. 360, 361; March 20, 1880, p. 445, as a communication from the pens of the distinguished physiologists and therapeutists of London, Drs. William Murrell and Sidney Ringer. Following this article were others of a similar nature in the *Lancet*, and one appearing in the *London Pharmaceutical Journal and Transactions*, April, 1880, from the pen of the distinguished curator of the Pharmaceutical Museum of London, Dr. Holmes, upon the subject of the "Botanical Origin of Tonga."

Believing that Drs. Murrell and Ringer, from their high professional position, would never have investigated and published the results of their investigations of any drug in the *London Lancet*, without it was free from any contaminations of a proprietary nature, Messrs. Parke, Davis & Co. of Detroit, assumed that Tonga was common property, and accessible to the reach of any house of sufficient enterprise to seek the drug in its native habitat. Acting on this supposition, that firm dispatched the botonist in its employ, the lamented Dr. Hansen, to the Fiji Islands, 7000 miles west of San Francisco. He remained in the islands six months, which visit resulted in the final shipment of a large supply of the new drug to Detroit, which was at once placed on the market by Messrs. Parke, Davis & Co. The energy displayed by this house in bringing tonga to the notice of the American profession, soon attracted the notice of Allen & Hanburys, who addressed them a letter on the subject, saying, "You can hardly be aware that the name 'Tonga' is our property, and

was agreed upon by us with the first proprietor on behalf of himself and the discoverers of a certain combination of drugs for neuralgia, and that the papers cited by you were written in reference to this special combination. Even if you were in possession of the original combination, which is manifestly highly improbable, it would be so obviously unjustifiable to seek to appropriate our name, which is a registered trademark, and the accounts given of our friend's article, that we cannot doubt, on the facts being thus pointed out to you, you will at once cease to use the name Tonga, and also to quote as referring to your article the papers alluded to."

But Messrs. P. D. & Co., did not see the matter in that light. Tonga was not patented either in Europe or America, and therefore, any one had a perfect right to the free use of the article, and to use and sell it under its proper name, viz: Tonga,—the name, and, in fact the only name by which the article was known to the public. So this firm went on with the tonga enterprise in spite of the warning.

Then came a suit from Allen & Hanburys for infringement of trademark. The bill of complaint in this case so thoroughly illustrates the trademark scheme that I cannot forbear quoting from it as follows:

"And your orators say, that by the outlays of moneys in giving publicity through the newspapers, by means of show cards, circulars and otherwise, said trademark, to wit, the word "Tonga" has come to be known throughout the United States as standing for a particular medicinal preparation manufactured by them, so that a great number of persons who have never seen your orator's labels, bottles or cases, and do not know your orators to be the producers thereof, or who is the producer, know of said preparation, and in buying are governed wholly by the name, and who, where they see a preparation bearing the word "Tonga" suppose it to be your orators' true and genuine preparation."

In other words, Messrs. Allen & Hanburys asked to be rewarded by the grant of a perpetual monopoly by the governments of Great Britain and America, not because they had invented a new and useful article, but because they had, in some way not stated, got hold of this secret compound of barks, long known in the Fiji Islands for neuralgia, and advertised it extensively to the public, thereby making themselves competitors of the medical professions of both countries in treating the sick; encouraging people to be their own physicians and to attempt a diagnosis and treatment of neuralgia, thus running the risk of serious error from a mistaken diagnosis and the absence of skillful medical assistance; and controling unfairly the sale of an article not patented, and therefore free to all. Manifestly such a monopoly would be unfair to all parties concerned, would defeat the very end for which the patent law was devised, would hinder progress in science by locking up to the exclusive use of one firm all the literature published by Drs. Murrell, Ringer and Holmes, would

hinder progress in the arts of pharmacy and therapy by preventing proper investigation of the drug, and would mislead the public, and injure the practice of both pharmacy and therapy.

The letter of the attorney of Messrs. P. D. & Co., explains what became of this suit. He says, "In the case of Hanburys *v.* Parke, Davis & Co., the complainants on their own motion obtained an order of court to dismiss bill of complaint, with costs to be defrayed by themselves. This order was obtained after the defense had established by the testimony of Dr. Frank E. Stewart and of Dr. Charles Rice, both of New York, that the word Tonga had long been known and had long ago been applied both to natural products and to medical preparations. It was thereby shown that the claims of complainants that they had invented the word Tonga and first applied it to medicinal preparations had no foundation in fact whatever.

"Tonga is the name of a group of islands in the Pacific Ocean; it is the name of a certain kind of lizard found upon the shore of Madagascar, and is the name of a medicinal liquid used by the natives of Peru."

The withdrawal of Messrs. Allen & Hanburys prevented another decision from the courts on the most important point at issue, viz: the ownership of proper names. The courts had already decided the point several times, however. "There must be some word or sign, or device other than a generic name and words descriptive of quality. (Commissioner's decision, 1881, p. 97.) "So the words Night-blooming Cereus were held to be invalid as a mark, being the proper descriptive appellation of the article." (Phalon *v.* Wright, 5 Phila., 464.) The same rule defeated the adoption of the words, "Desiccated Codfish." (Harris, Beebe & Co.) In the case of the "Balm of a Thousand Flowers," Judge Duer, of New York, says, "It is only the seductive name that they claim as their exclusive property, and doubtless from their experience in its value in the extension of their sales. This, however, is a species of property which in my opinion is unknown to the law, and that can only be given to one by an infringement of the rights of all. * * * It has been repeatedly held that a trademark cannot be obtained in a name where it is the proper name for the article, as in the case of Schnapps, the subject of the controversy in Wolf *v.* Goulard, or where it has by general use become the proper name of an article which all manufacturers may use, as in the case of Dr. Johnson's Yellow Ointment, Godfrey's Cordial and Essence of Anchovies."

One well known legal writer says, "The policy that the mere use of a name to designate an article would give to those employing it the exclusive right to designate such article by such name, would be giving a copyright of the most odious kind, without reference to the utility of the application or the length of the title, and one that would be perpetual."

And another writer says, "Neither the trademark law, nor the copy-

right law, nor the patent law, affords any such right, or under the pretense of the same, allows any one to throttle trade under the alleged sanction of law."

THE HORSFORD'S ACID PHOSPHATE CASE.

In the year 1868, March 10, Prof. Horsford patented the use of liquid acid phosphate of lime as a condiment. To this article he gave the name "Horsford's Acid Phosphate." According to law the government granted Prof. Horsford the exclusive use of his invention for a limited time in exchange for a publication of full knowledge thereof, whereby the public may be able to manufacture the invention when the patent expires. The patent has expired, therefore any one has a perfect right to manufacture and sell the article under its proper name, viz: Horsford's Acid Phosphate.

Acting as he had a perfect right to do, Mr. Geo. L. D. Muth, a druggist in Baltimore, commenced to sell acid phosphate other than that made by the Rumford chemical works. This brought upon him a suit by the Rumford chemical works, (the original manufacturer,) which suit has been decided in favor of Muth by the United States circuit court for the district of Maryland, and has been appealed to the Supreme Court of the United States.

The brief in this case states:

"This is a suit for alleged infringement of trademark.

"Complainant claims that in 1868 it began the manufacture of a medicinal preparation to which it first gave the name "Horsford's Acid Phosphate;" that its said preparation has become known by the words, "acid phosphate;" that these words have become its trademark, indicating solely that the article so designated is made by complainant; that on Oct. 13, 1885, it registered these words in the U. S. Patent Office as a trademark, and that the defendants have infringed said trademark by selling Liquid Acid Phosphate.

The defendants answered as follows:

"1. Acid phosphate is a known generic name, and was so long before complainant adopted it.

"2. If complainant's medicine contains one or more acid phosphates, the term is descriptive.

"3. If complainant's medicine does not contain an acid phosphate, its use of the term is misleading.

"4. Complainant has admitted that Acid Phosphate is the name of a medicinal preparation, and that its trademark for that preparation is Horsford's.

"5. The patent on complainant's preparation having expired, anybody can make and sell it as Horsford's Acid Phosphate."

As it is important that the Transactions of this Association should contain sufficient decision to help pharmacists all over the country who are

liable to be so pounced upon by "patent" medicine houses, for making preparations now patented as soon as the patents run out—because the favorite scheme now is to claim unlimited monopoly under the trademark law—I will quote some of the cases used by the defense in this case.

First, as the public now has a right to make and sell the article under the name Horsford's Acid Phosphate, because the patent has expired, the following applies:

"No one can claim protection for the exclusive use of a trade-mark or trade name which would practically give him a monopoly in the sale of any goods other than those produced or made by himself. If he could, the public would be injured rather than protected, for competition would be destroyed. Nor can a generic name or a name merely descriptive of an article of trade, of its qualities, ingredients or characteristics, be employed as a trademark, and the exclusive use of it be entitled to protection." Canal Co. *vs.* Clark, 13 Wall., 323.

"We of course understand that when a name is coined by one who uses it as a trademark upon a particular article, if that name is originally a lawful trademark, its subsequent adoption by the public as a common appellative cannot take away the right already acquired." Celluloid Co. *vs.* Cellointe Co., 32 Fed. Rep., 98.

But "When an article is made that was theretofore unknown, it must be christened with a name by which it can be recognized and dealt in, and the name thus given it becomes public property, and all who deal in the article have a right to designate by the name by which alone it is recognizable." Leclanche Battery Co. *vs.* Western Elec. Co.. 23 Fed. Rep., 227.

"A word which is the name of an article, or indicates its quality, cannot be so appropriated. Every one has the right to manufacture the same article, and to call it by its name or descriptive character." Phalon *vs.* Wright, Am. Fr. Cas., 308.

The names "Ferro-phosphorated Elixir of Calisaya Bark," "Paraffin Oil," and "Liebig's Extract of Meat," have each been held by the courts as descriptive.

The Tonga case and that of Horsford's Acid Phosphate well illustrate the tendency of the proprietary system. Let us study for a few moments the effect of the system on Pharmacy.

EFFECT OF THE PROPRIETARY SYSTEM ON PHARMACY.

One of the principal points that I wish to make in my paper is that pharmacy is a part of the science of medicine, and its practice is a part of medical practice. For this reason pharmacy ought to be recognized as one of the liberal professions, and the pharmacist should rank professionally and socially with the doctor, lawyer and clergyman. Now I believe that the proprietary system is one of the greatest barriers to a realization of this ideal. The following are some of my reasons:

If the proprietary principle had been carried out in the arts during the past, we would have had each art a monopoly forever. The inventors of pens, ink, paper, cloth, needles, pins, and what not? would have owned the exclusive right to manufacture these articles, and have handed it down to their heirs. The final result would be either that the rest of the world would become the slaves of rich monopolists, or being in the majority, would finally rise in one mighty rebellion and throw off the yoke. But it is in some respects even worse when the article claimed as an invention is merely an aggregation of old and well-known things, for if by mixing together several old things, and giving the mixture a new name, a new thing can be created, and the world made to believe that the compound has marvellous virtues not possessed by any of the articles individually, a demand is created for the new, to benefit the manufacturer of the new at the expense of those who are engaged in the manufacture and sale of the old. In this way new compounds of the well-known drugs of the Pharmacopœia are introduced, and the trade at large suffer in consequence. Thus, as in the case of Helmbold's Buchu, a little drug, well diluted with water, can be made to fill the demand for medicines to the amount of one or two millions of dollars annually, and the wholesale druggists as well as the professions of pharmacy and medicine are made to suffer thereby. In such a case as this, all that I have said against the proprietary scheme applies with only greater force, for it is a downright fraud introduced under the alleged protection of law.

But the acme of devilish ingenuity is reached in a case like "Scotch Oats Essence." Here a proprietary medicine was introduced as a great invention to cure the opium habit. The victims of this pernicious vice found a solace here, for it contained sufficient morphine to satisfy their morbid desire. Alcohol, in the form of cheap whiskey, bitters and the like, as well as other stimulants and narcotics, are sold to an enormous extent as "patent" medicines; and the poor deluded victims, in their efforts to escape from diseases or bad habits, not only plunge in the deeper, but do so in the vain attempt to escape, while the human vampires who manufacture and sell these villainous compounds, fatten on the blood of their victims. "Patent" medicines, indeed! can you wonder that the medical profession, ignorant of the true intent of the patent law for the most part, and seeing such an abuse as this under the guise of law, have no use for the patent system?

When the proprietary medicine system is applied to pharmacy, however, a new and serious evil presents itself. Pharmacy is the science of preparing medicines. It depends on materia medica, or the science of the substances used in medicine, and therapy, or the science of the application of medicines to the cure of disease. In fact, pharmacy is a part, and no mean part either, of the science of medicine. For progress in medical science, as far as the knowledge of drugs and their preparation

and application is concerned, it is necessary that pharmacy should conform to the requirements of science. What are these requirements?

Science, according to President Porter, professes to exhibit what is actually known or may be learned in the forms of science, viz: in the forms of exact observation, precise definition, fixed terminology, classified arrangement, and rational explanation. Of course very little is actually known or may be learned concerning a medicine, knowledge of the nature of which is retained by the manufacturer as a secret for trade purposes. Exact observation is impossible, precise definition cannot be obtained. The names given are unscientific, and cannot be accepted as correct nomenclature. Classified arrangement of partial knowledge is impractical. There can be no rational explanation of the action of a remedy unless its exact composition is known.

The result of this abuse is that many of the articles advertised in the medical and pharmaceutical journals, claiming to be pharmaceutical preparations, cannot be admitted into the Pharmacopœia, or accepted in scientific literature, for the reason that the names of these preparations are claimed as private property, and their formulæ and art of manufacture are nowhere published, but are things of trade secrecy. The pharmacy of these articles, therefore, is in danger of becoming a lost art, and their disappearance from existence is merely a question of time. What will be the effect on the literature of medicine if medicinal preparations, the names of which are often incorporated in medical text-books, no longer exist in the more or less distant future? Unless every new preparation introduced is provided with a name which is compatible with scientific nomenclature and free to the use of the public, and its formula is published in standard literature in such a manner as will enable the pharmacist of the future to manufacture the article, the pharmacy of the nineteenth century will not be properly represented in medical science, and the public will suffer in consequence on account of the loss of valuable processes for preparing medicines to cure the sick.

It is very evident, then, that pharmacy, being a part of medical science, should be elevated to a scientific standard; and the practice of this art being a branch of medical practice, it should be regarded as a medical specialty, and held accountable to the laws that govern a liberal profession.

Furthermore, the proprietary system keeps the pharmacist down socially. The great Dr. Gross in his autobiography, when speaking of those who have obtained note as proprietary medicine manufacturers, says that, although fortunes have been made by the business, it is rare indeed that these men have attained social distinction. Those who make and sell "patent" medicines can never stand high socially.

The proprietary system creates a feeling of bitterness between the professions of pharmacy and medicine. The medical profession will

always regard the "patent" medicine business as a "low-lived" trade. Just so long as pharmacists make and sell these compounds there can never be harmony between the two professions.

The proprietary system injures pharmacy in the eyes of scientific men all over the world. The concealment of knowledge for trade purposes is considered contemptible by scientists in every department of scientific work.

The proprietary system exalts money-making above philanthropy. The principal aim is to make money, even by the misrepresentation of facts in many instances, thus sacrificing beneficence to greed. The liberal professions exalt humanity above money. The reward is to the one who sacrifices self to benefit his fellow-man, and not to him who sacrifices his fellow-man to benefit himself. It would be an evil day indeed when the lofty sentiment of unselfishness is put down as a lower motive than gain. No longer would we honor such heroism as that of Captain Murrell of the *Missouri*, who sacrificed his cargo and endangered his position to save seven hundred lives aboard the ill-fated *Danmark*. No longer would our hearts thrill when reading of the heroism of engineers who stand at their posts and bravely meet death to save the lives entrusted to their care. Just to the extent that the professions benefit humanity will professional men stand high in the estimation of their fellows. A profession run under the proprietary system, which notoriously represents, as a rule, the money-making idea as opposed to the humanitarian idea, can never rank in the minds of thinking men, except as a trade—certainly not as a liberal profession.

The proprietary system depreciates education and skill, and puts in its place ignorance and credulity. By adopting it, pharmacy will lose its high position among the professions calling for the scientific application of knowledge to manufacture. The one who can most successfully humbug the public, and not the educated, skillful pharmacist, will win in the race under the proprietary system.

If pharmacy is a part of the science of medicine, it should hold a place in the literature of medical journals equal with therapeutics. This it cannot do under the proprietary system.

If pharmacy is a part of medical practice, then pharmacists in good professional standing should be admitted to the Medical Societies, and physicians should be welcomed to Pharmaceutical Associations as well. But these happy results can never be secured until the pharmacists are clear of all contamination.

CONCLUSION.

I think I have said enough to show what is the policy of the patent and trademark laws in relation to the science of medicine, and the useful arts of pharmacy and therapy, and I think I have proved to you the malign policy of the so-called "patent," "proprietary," or "trademark phar-

maceutical" business in its relation to the same science and associated arts. I presume you now ask what conclusions I would draw from the facts I have presented before you.

The limits of the paper will not permit me to present to you my conclusions at great length. Briefly, they are as follows:

1. Abolish secret formulas.

2. Let the Supreme Court of the United States define the scope* of the patent, copyright and trademark laws in unmistakable language. This seems necessary when there is so much difference of opinion among leading members of the bar regarding their true scope.

3. "Patent new and useful inventions in medicine." But limit this high reward to real inventors of things new and useful, and not to those who devise mere aggregations of old and well known drugs, and call such inventions.

"How are we to abolish secret medicines? There is a way. Pass strict laws in each State against adulteration of food and medicine. As food and medicine must have a standard of purity, insist that formulæ shall be published, and make the published formula in each case the standard for that article. Then pass a national law to prevent the transit of adulterated products from one State to another, and consider all foods and all drug preparations contraband, the formulæ for the composition of which are not published."

Let us not forget that to promote the highest good of mankind, and especially to promote the good of the profession, is worthy of our noblest ambition. Let us not forget the inestimable value of knowledge, and the importance of its universal diffusion, as a means to that end; remember also that knowledge is not science until it is published in the classified forms of science, and protected by a changeless nomenclature. It is idle to call anything else the science of medicine or pharmacy. Do not forget the noble men who have devoted their lives, often at the cost of much self-sacrifice, to benefit the cause of science and promote the progress of the profession.

And what reward is offered for all this? you ask. "It is money we are after, not glory, and while your plans are very philanthropic and all that, there is no money in them." To such I can only answer that the first duty we owe is to humanity, and self-interest must be made secondary to that. The question is not, is there any money in it? but, what is for the best interests of humanity? Shall we sanction a system that hinders progress in science and the arts? or shall we adopt one to promote progress in knowledge and its application to means for the relief of human suffering?

Neither is money the highest reward. Money is only of value accord-

*See my article in *Druggists' Circular* for April, 1889.

ing to its purchasing power. There are some things that money cannot purchase. It cannot purchase an approving conscience, neither can it purchase the regard of our fellow men in the higher sense.

Lord Camden once said, "Glory is the reward of science, and those who deserve it scorn all meaner views. * * * It was not for gain that Bacon, Milton, Newton, and Locke instructed and delighted the world. When the bookseller offered Milton five pounds for his Paradise Lost, he did not reject it and commit his poem to the flames, nor did he accept the miserable pittance as the reward of his labor; he knew that the real price of his work was immortality, and that posterity would pay the debt."

Who can estimate the money value of the discoveries of Newton, Franklin, Fulton, Harvey, Pasteur, and scores of other scientific investigators? And who can pay them in money full value for their services? Do such men work with money as the end and aim of their labors? Perish the thought!

But there is a higher reward for men who obey the law of love than mere earthly glory; and they are those who, forgetting all earthly considerations, serve the great cause of humanity with a higher aim than glory. Misrepresented and misunderstood, such men have bravely kept on in their chosen way, despite the jeers of their enemies and the opposition of their friends, knowing that the cause of right is God's cause, and that He who rules over the destinies of men sees the hearts of men and weighs their motives; and that He will reward devotion to His cause with a crown far more valuable than the praise of men.

Yet while I advocate such views as those just expressed, I cannot too strongly insist regarding the value of money as a means of furthering scientific research. It is a false position, that taken by many scientific men, that they will not receive money for scientific work. The lamented Dr. Randolph, late Demonstrator of Biology in the University of Pennsylvania, and editor of the *Medical and Surgical Reporter*, once said to me: "You have convinced my judgment that a scientific man can receive money for scientific work without stultifying himself; but so strongly am I prejudiced against it by education contrary to the idea, that I never can accept the money." I believe that the "workman is worthy of his hire," and I do not believe in muzzling the ox that treads out the corn. Because of this belief, I also advocate that the medical inventor who discovers some new and valuable invention in the methods of preparing or applying medicine, should be rewarded by the grant of the exclusive use of his invention for a limited number of years, provided he shall publish full knowledge thereof, so that the public may manufacture the invention when the patent expires.

Mr. Kennedy read the following:

ON PHARMACOPŒIAL COMPOUND GALENICAL PREPARATIONS.

QUERY 4.—Is it not advisable to drop from the United States Pharmacopœia all compound galenical preparations?

BY JOSEPH P. REMINGTON.

The efforts of scientific therapeutists and pharmacists during the last century have been constantly directed toward simplicity in the composition of the remedies intended to heal the sick.

The development of the study of therapy has shown that great difficulties have to be encountered in determining the true action on the economy of even the simplest and most decided remedies; and whilst this remains true, the knowledge of the action of compound remedies must involve still greater difficulties, and to a great extent it must continue to be based upon empirical observations. To recur to the past, the most celebrated remedies of our forefathers were marvels of polypharmacy; the famous "Theriaca Andromachi," with its farrago of sixty-one different ingredients, furnishes a good illustration. This electuary was prepared under official supervision; in some countries the ingredients were openly placed upon tables in the streets for the inspection of physicians and examiners, and in Nuremberg, as late as the eighteenth century, the preparation of Theriac was celebrated with great pomp at a national festival. With the decline of mystery, superstition and witchcraft in the composition of medicines, at each revision of the Pharmacopœias the compound galenical preparations, which have been based upon them, have been gradually improved, until the Theriac of old has been shorn completely of its mystery and majesty. The French Codex, however, still retains Theriac with fifty-seven ingredients, although there has been some improvement even here, as at one time the "electuarium opiatum polypharmicum" of the Codex contained seventy-two ingredients, including the flesh of the viper.

The British Pharmacopœia, under the name of Confectio Opii, retains all that was valuable in "poor old Theriac," by making it from opium, black pepper, ginger, caraway, tragacanth and syrup, while the United States and German Pharmacopœias omitted it entirely in the last revisions. A study of a number of other compound galenical preparations will show what the tendency of modern pharmacy has been in the past, and it is wise and timely to consider what should be the policy of the Committee of Revision of the Pharmacopœia in the future, in regard to this class of preparations. A Pharmacopœia must be conservative if it is expected to be useful in this country. It cannot be hoped that the practice and habits of over one hundred thousand physicians and pharmacists can be changed by one stroke of the pen of the Committee, particularly when we reflect that there is no legal obligation whatever for one of them to use the Pharmacopœia; hence the wisdom of former revisers has been

shown in *gradually* moulding and educating those for whose use the Pharmacopœia was devised, by admitting compound galenical preparations, but at each revision omitting such ingredients as were found to be superfluous, and thus therapy and pharmacy have been improved and brought nearer the goals of exactness and accuracy.

Another question presents itself in this connection: Shall the Pharmacopœia *admit* any compound galenical preparations at its next revision? This brings into view another object of a Pharmacopœia, which is to improve the practice of medicine and pharmacy already existing in the country; if the Pharmacopœia persistently ignores the existence of preparations that are in constant use, and refuses to admit them, it simply weakens its own influence and defeats its own object of being an authoritative guide in medicine and pharmacy upon the practice of its own time.

Then is it not wisest to admit such compound galenical preparations as have fully proved their usefulness by their extensive employment? If they are admitted, they should be purged of all superfluities, and the processes made so practical and free that every pharmacist in the land can make them without prejudice to his neighbor. In conclusion, the writer desires to answer the query by stating that it is his opinion that all compound galenical preparations which have not thoroughly established their usefulness throughout the country, should be dropped from the next revision of the United States Pharmacopœia; and that none should be admitted to that authority except such as will stand the same test of extended usefulness; and if admitted, the processes must commend themselves to the practical worker as models of simplicity and elegance.

Mr. Calvert read the following, which was accepted and referred:

EXTRACT OF OPIUM.

Chinese Method of Preparing.

BY JOHN CALVERT.

Some years ago I had an excellent opportunity of observing the process of manufacturing this extract as followed by the Chinese experts, who prepare the domestic article from Turkey opium in San Francisco. The details of the process are kept as a profound secret by them and their employers, the wealthy Chinese merchants; but owing to exceptional circumstances, I was enabled to study the subject and become thoroughly conversant with every point. And I may as well state before proceeding further, that I am betraying no confidences, and I paid dearly for the information which I am about to place before you. I do not think that even now I should have been inclined to expose the details of a process which has a considerable commercial value, except for the reason that this occasion is a remarkable one in the history of American pharmacy.

I need not tell you how to prepare extract of opium. It is merely an aqueous infusion evaporated on a water bath to a pilular consistence.

An addition of 5 per cent. of glycerin is ordered in the last edition of the United States Pharmacopœia.

The Chinaman proceeds otherwise. His apparatus consists of two charcoal burning fire-clay furnaces, about 15 inches high and of about the same width, open on three sides; some palm leaf or other cheap fans, for fanning himself and the fire; several brass pans, such as are here shown; a brass ladle and several tin ones; a large spoon for skimming; a grid-iron, two pair of pincers for lifting the pans, and some thick woolen cloths to protect the hands, some fibre brushes, several buckets, basket strainers, muslin for straining, fibrous material for drawing off the liquor, some heavy sticks to be used as pestles, several spatulas, about a foot long and 3 inches wide at lower end and made of oak or ash, and a steel bladed scraper.

One or two low stools complete the arrangements. The operator does not require any tables or benches, as all the work is done on or near the ground. The operation requires two days, but after the first day, the two days' work goes on regularly, and a batch of extract is turned out by the same workman every evening.

The quantity of opium operated upon, so that a workman can do a fair day's work, is usually about 16 or 18 pounds. The balls are placed in tepid water, to soften the surface, and they are washed by hand to remove grit, leaves and other foreign substances.

The material is then placed in one of the shallow concave brass pans, which is kept gently heated over the naked charcoal fire, and by means of the wooden pestle, is kneaded into a soft paste. When homogeneous, the softened opium is uniformly spread over the inner surface of the pan, and patted down by the hand, so as to give it a smooth surface. The heat is continued until the greater part of the moisture has evaporated, and the opium has become so solid that the pan can be turned over. The direct heat of a very small fire is now allowed to act directly on the face of the opium by turning the pan upside down. This has to be carefully and skillfully done. As soon as the surface of the material has become sufficiently hardened, it is deftly removed in thin layers, and this is continued until all the opium has been taken from the pan, except the dried portion which remains attached to the bottom and sides of the vessel. This is scraped off.

The gridiron now comes into play. The crusts which were laid aside in the former operation are now put on the gridiron a few at a time, with the greatest care, to avoid breaking them, and are toasted over the charcoal at a low temperature until they have become perfectly crisp. The crusts are then placed in one of the brass pans, covered with warm water, and left standing until the next morning.

On resuming work the infusion is drawn off into buckets through baskets lined with muslin strainers.

The brass pan is slightly tilted, and by means of a knot of vegetable fibre the liquor is drawn off over the edge of the pan without loss. The roasted opium is drained, and a second quantity of warm water added, with as little breakage of the crusts as possible, and the extraction is finished with a third lot of water. Only the first and second infusions are used for the extract; the washings and weak infusions are employed for the extraction of the next batch. There seems to be no precise rule as to the quantity of water for making the infusion; the crusts are merely covered.

The infusion is then mixed with some egg albumen and a part of it is placed in the largest of the brass pans over the naked charcoal fire, and is heated, skimmed and boiled constantly. The pan is not filled, but room is allowed for frothing, and fresh portions of warm infusion containing albumen are added from time to time as the bulk diminishes. During the boiling there are several matters to be attended to, such as keeping up the fire, or banking it up with ashes if too hot, prevention of boiling over by addition of small quantities of the infusion, or of water, and keeping the sides of the pan free from hardened extract. This is effected by water and the fibre scrubbing brushes. When all the infusion has been added, and the evaporation has proceeded as far as is considered to be necessary, the pan is removed from the fire, and the extract constantly stirred by means of a wooden spatula in a current of air produced by fanning until cool and uniformly mixed.

The yield of extract varies according to the kind and quality of opium, but I have not observed any very remarkable difference between the results of this, and those of the ordinary pharmaceutical methods. Eigtheen pounds of first quality Turkey opium generally yield about ten pounds of this extract.

The greatest watchfulness is exercised over the roasting or toasting part of the process. Although a small exposed corner of the crusts may become charred occasionally, the object of this operation is to expose the opium to such a heat only as to render it porous, to do away with the quality of stickiness, which is said by some authors to be produced by an easily decomposed caoutchouc-like substance, and to allow the aqueous extractive matter to ooze out of the material without stirring.

Notwithstanding the constant repetition of cautions in all the text-books, dispensatories and other pharmaceutical literature respecting the care to be observed about subjecting opium to heat, I do not find that there is any appreciable difference in the yield of morphia when opium has gone through this barbarous process.

Whatever changes may take place among the other proximate constituents is not known, but I am quite satisfied as to the fact that the natural morphia salts, protected by extractive, are not decomposed, or only to a very small extent, by such a heat as is necessary for the desired alteration of the valueless or inert matters contained in opium.

MR. CALVERT.—It does not appear from the assays which I have made of a great number of samples of Chinese made opium—that is, opium made in Hong Kong—that the morphia is the essential thing that the Chinese want: I found that some of the samples did not contain more than three to four per cent., and I have obtained samples which did not contain one per cent. of morphia; I have had a sample which had the right appearance, but did not contain a trace of morphia that I could discover. The packages of Chinese opium contain five Chinese taels, and it takes about three of those packages to the pound. The duty is $10 per pound, and the custom house officers have much trouble with it; there has been a great amount of smuggled opium introduced into this port through the agency of the Chinese steamers, and a large quantity comes across the sound, and is brought down to San Francisco by freighting vessels, besides a great quantity that comes overland.

MR. RUPPERT.—The old way was to dissolve the opium in water and smoke it without going through this elaborate process. I know that what one would reject the other would take, and claim it was the best opium. So I judged that neither of them knew much about it.

MR. GRAZER.—There must be a large per centage of coagulated albumen present.

MR. CALVERT.—I prepared some opium in the common way for some Chinese, in order to test that very point, and they rejected it and said it was "no good," and they would not use that kind. I never had an opportunity of preparing a batch of opium from that process; but, I believe that all their opium goes through this process. A gentleman in Hong Kong went through an opium factory, and he gave the details of the process very much as I have given them, with the exception of the roasting or toasting—and that I regard as the essential part of the process, because you do away with that mucilaginous condition which hinders the extraction of opium a great deal. If you operate upon large batches of opium you will find great difficulty, although you don't have so much difficulty in small quantities.

If you want to operate on a large quantity of opium you will find that this plan facilitates matters very much. I have no doubt you could get up an arrangement by which the opium could be worked out into a thin sheet; that would answer the same purpose; there is only a certain heat required, and that is not a burning heat.

MR. RAY.—I think Mr. Eckman can give us some light upon this matter, as he has had some experience in its preparation.

MR. ECKMAN.—I have tried an experiment, removed a part of the morphia from the opium, and made money by selling the morphine to the white men and the opium to the Chinamen to smoke.

THE CHAIRMAN.—I think by following that plan we would have the morphine, and the opium would be less harmful to those who smoke it.

MR. GRAZER.—I have seen a preparation made from the scrapings taken from old opium pipes, which are sold over again, and purchased by the Chinese. There certainly cannot be any virtue in these things, and still they are scraped together and sold.

MR. MAISCH.—Is it not possible that there may be different qualities of extracts in the Chinese market for smoking purposes, higher priced and lower priced qualities?

MR. CALVERT.—The lowest priced kind of Chinese opium is the kind which has just been mentioned by Mr. Grazer—that is, the residues that have been left in the pipes. That is made into an extract by the Chinese, and is sold to the very poorest Chinese. Some

that was brought me by a Chinaman contained no morphia, and it gave out a very disagreeable odor when burned.

Mr. Ebert.—I have never been in a Chinese smoking establishment, but while this discussion is going on, this query comes to me: when the opium is burned in smoking the pipe, has the morphia that is present in the opium any narcotic effect? Can that be answered?

The Chairman.—When it is destroyed, of course not.

Mr. Ebert.—I don't know anything about the smoking of opium, but believe that the opium is burned in smoking; there is fire there, and the opium is destroyed. Now, does the alkaloid morphia present produce any narcotic effect under this condition?

Mr. Maisch.—I think the alkaloid morphine as such is decomposed, but other alkaloids are formed.

Mr. Ebert.—I made many experiments for the purpose of deodorizing opium, in making deodorized or denarcotized tincture of opium. The effect of opium on the system, especially in its fresh state, is that it produces a narcotic effect through the morphia and other narcotic principles; but there is a resinous or odorous principle present which has a very serious after effect, producing a peculiar debilitation. The first effect is exhilarating and then depressing—the same as whisky does. When opium is treated for instance with benzin or ordinary petroleum ether, we remove a resinous substance which in itself has a peculiar exhilarating effect, or seemingly tonic. I have tried that on myself—not on my clerks; afterward it produces a terrible headache, this resinous principle. It ignites easily and burns well. Now, is not that the principle really that the opium smoker wants? That is the question I am trying to get at. It is not a pure resin; it is a kind of gum resinous matter. It does not put you quite to sleep, but it produces a kind of a prickling sensation on the skin, and it afterward leaves you with a most terrific headache; it has always done so on me.

The Chairman.—When the Chinese smoke opium, I believe it puts them soundly to sleep.

Mr. Ebert.—This resinous principle is what I have thought after this paper was read might be the principle that the Chinese expected to get when they were smoking this extract of opium; and in connection with this I would like to make another statement, and that is this: When we use ether in making deodorized tincture of opium, we extract from the opium a principle that we ought not to extract, and that is narcotin. It is generally known that narcotin has no such effect as has been attributed to it. It is simply a tonic, not a narcotic, and it should not be extracted from opium or from the deodorized tincture of opium, and for that one reason ether ought not to be used in the manufacture of the deodorized tincture of opium, because ether does extract the narcotin. Another thing: we know that a very old opium pill can be borne by a stomach without producing a bad after effect of opium, while a new opium pill always does that.

Mr. Calvert.—I would like to state for the information of Mr. Ebert that I prepared some extract of opium: I made an assay of it, and it contained about 18 or 19 per cent.—I forget which—of morphia, and I had another sample of Chinese opium which contained only about 3 per cent. of morphia. I submitted those samples to some Chinese merchants whom I knew very well, and who I knew would give me a very direct answer to my question, and asked them, "Will you take samples of these opiums and let me know the effect they will have upon you?" I wanted to test that very point

as to whether the morphine was the constituent which produces the effect; and they told me they could not distinguish one from the other.

Mr. Ray.—I understand Mr. Eckman has smoked opium, and he has made analyses from the pipes, and knows all about it.

Mr. Eckman.—After what Mr. Ray has said I have to get up, if only to say that I only smoked it once, but I learned from an experienced smoker that it will take three weeks to begin to feel good from it; I received nothing but a headache from it, and did not care to make another trial. I made a number of experiments with the scrapings from the pipe, which contained eight to nine per cent. of morphine I believe—I don't remember exactly, as the experiments were made several years ago. The resinous principle that Mr. Ebert asked about I believe is burned out in the act of cooking the extract before it is smoked; it is burned for a good while before they smoke it.

The following paper was read by Mr. Whelpley, accepted and referred:

HOW TO CONDUCT A QUIZ CLASS.

BY H. M. WHELPLEY, PH. G., F. R. M. S.

By looking over the announcements from the thirty incorporated institutions in the United States, where the art of compounding and dispensing medicines is taught, I find that with few exceptions, quiz classes are mentioned as being depended upon in the work of disseminating pharmaceutical knowledge. By means of private correspondence, I have learned that quiz classes are formed in some of the schools that make no mention of that fact in their annual catalogues. As the number of colleges of pharmacy is quite rapidly increasing, and as the importance of quiz classes as a factor in pharmaceutical teaching must, therefore, be gaining greater prominence each year, I decided to make note of a few observations, gained during a period of five years' experience as a quiz master in a college of pharmacy. These I present here for your deliberate consideration.

ORIGIN AND USE OF THE WORD QUIZ.

It is supposed that the word "quiz" originated in Dublin, and was coined by a play-house keeper named Daly. This man wagered a friend that he could have the citizens of Dublin inquiring about a meaningless word within twenty-four hours. Accordingly, during the following night he caused the word *q-u-i-z* to be written on the walks, walls, fences and other conspicuous places in the city, and awaited results. The next day men, women and children were all curious to know what the word meant, and why it was so promiscuously scattered about their homes. Thus the word came to be added to the vocabulary of the English language, and has never lost the significance attached to it on that occasion.

But we, as pharmaceutical educators, in assuming the responsibilities of our office, should not look upon the use of the word in exactly the same sense as it was employed in its infancy. We should make use of it for higher and more noble purposes. It is true that the quiz master must

awaken in the students a desire to penetrate the unknown, but that unknown should always be useful knowledge, and not a mere meaningless conundrum for the amusement of idle brains.

Quiz classes should be formed for the purpose of reviewing the lectures and impressing upon the minds of the students at least the essential points in the lecture given them. Every good lecturer rounds out his discourse with matter relative to the subject of which he treats, but not essential for studious consideration.

In the second place the quiz master should find out just how much each student knows about the subjects of the lectures to which he has listened. He should correct the many erroneous conclusions that members of the class always draw from even the best of lectures. Such a procedure not only stimulates the students to their work, but it keeps them in the right line of study.

Lastly, the quiz class should bring the students together in a harmonious manner, so that the intellectual labors of each will promote a progressive spirit in the minds of the others. It is the duty of the quiz master to stand midway between the classes and the professors, in such a manner that he imparts to the inquiring mind knowledge that does not properly fall from the lips of a lecturer.

THE PROPER QUALIFICATIONS OF A QUIZ MASTER.

Taking the above objects into consideration, we next logically look for the methods of procedure best adapted to their accomplishment. In the first place, success depends as much upon the qualifications of the quiz master, as on the capabilities of the students. As the natural and acquired attributes of the students who enter the colleges of pharmacy are beyond the control of the quiz masters, who must take them as they are admitted to the college, it becomes doubly important that the quiz master should have the faculty of successfully quizzing. This he will never acquire unless he takes a pleasure in the work. In addition to this he must possess a thorough knowledge of the subject or subjects, on which he quizzes. By thorough I do not mean a knowledge such as is gained alone from books and current literature. I refer more particularly to an understanding of the manner in which the lecturer treats the subject. The various sciences and their branches are advanced slowly by individual efforts, and each teacher, no matter whether a lecturer or a writer, puts forth ideas of his own and announces new discoveries he has made, and these the students should absorb, as they may not be able to find them elsewhere. The competent quiz master will attend all the lectures on his branch and study them so he can traverse the same territory during the quizzes without conflicting with ideas put forth in the lectures. Any antagonism between the lectures and quizzes not only confuses the students, but also leads them to suspect either the quiz master, or professor,

if not both, of ignorance. The person who cannot conscientiously endorse the substance of the lectures has no right to accept the position of quiz master on that branch.

Any person who quizzes a class should be so familiar with the subject and well posted that notes are unnecessary. A lecturer steps upon the rostrum with a definite plan of his lecture before him. This general outline is then followed during the discourse from either mental or written notes. The circumstances are entirely different with the quiz master. He has the substance of the previous lectures within which to confine his questions, but the order of procedure should be governed by the nature of the answers elicited from the class. I have tried quizzing both with and without notes, and I am now satisfied that the latter method is the more preferable one of the two. It is not only easier, but the attention of the class is held closer to the subject under consideration and permits of more serviceable work. I do not desire to convey the idea that notes should not be prepared for the quizzes. On the contrary, I find that such previous preparation is a good training for the quiz master. Such notes are also a record which serves as a guide in each successive year's work. They also serve to show how the lectures vary from year to year as the sciences taught advance.

FIND OUT HOW MUCH THE STUDENTS KNOW.

The methods best adapted to find out how much the students know about the lectures vary greatly with individual cases. In a general way I observe the following rules:

1. Select a convenient blank book, and in it place a list of the students' names, with a sufficient number of spaces after each name to credit the answers or record the failures which are made. The attempts at answering are to be rated from one to ten or ten to one hundred, and absentees designated by some special mark, such as x.

2. Particular attention should be paid to those who are frequently absent. When such cases become chronic, the parties should be interviewed by the Board of Trustees or some other proper authority. One member who attends only one-half the time retards the progress of the entire class, and causes more trouble than two students who do not miss a quiz.

3. If possible, each student should be called on during the quiz. I require each student to arise to his feet in answering a question, even if he can only say, "I do not know." This practice impresses the student with the importance of the occasion, and serves to elicit closer attention to the questions and more attempts to answer them. It is not best to call the names in any definite manner each time, but ask the questions in a promiscuous manner, so that a student never is forewarned by knowledge of when he is to be called upon to tell what he knows, or show what he does not know. I always try to impress upon the minds of the students

that a question for one is a question for all, and that each person must ask himself each question as it is asked the class. The irregular method I mentioned of calling upon the class is a good moral support for them to carry out the instructions to quiz themselves.

THE PROPER INFLUENCE TO EXERT ON THE CLASS.

The influence which a quiz master can and should exert in familiarizing the students with each other and their relationship to the college during their collegiate course, is by no means a small part of his duties. As a general rule the quiz masters are young men who have fresh in their memory not only the very studies which the students have under consideration, but also the remembrance of college days and the peculiarities of such a life. This fact has a great tendency to cause the members of the class to feel more at home with, and closer to, the quiz masters than they do to the professors. When I commenced to act in the double capacity of professor and quiz master in the same college, this relationship of professor, quiz master, and student dawned upon me rather forcibly.

The following are some of the points to be observed in order to turn this relationship to the best advantage for all parties:

1. When quizzing, always be careful to avoid embarrassing the student in an unnecessary manner. It is not well to make the dull ones appear stupid in the eyes of their associates, or to excite in the members of the class a feeling of envy or jealousy, by encouraging the more brilliant ones to appear as excessively smart human beings. All of this can be easily managed by proper care in the methods of questioning.

2. The class will appreciate having the quiz master walk around among the students as he asks questions, and not remain behind the desk as is customary and appropriate for a lecturer.

3. If a student is permitted to use his own language in answering, he feels much more at ease, and is much more likely to disclose how much he knows, than the person who repeats definitions, description, etc., verbatim from the text-books, or the professors' lectures. The student who said that the molecules constituting a gas are in a constant *repulsive* state, certainly understood that state of aggregation as it is commonly called. If he had answered in the orthodox language of the text-book, he would not have been so positive of his knowledge on the point.

4. Some students take it as a serious matter if they miss a question. Always explain to them that they are not expected to answer all the questions and that it would be useless for them to spend time and money for the quizzes if they knew how to answer every query propounded.

Many other methods of cementing the interest and good feeling of the members of the class to their work, to each other and to yourself, will occur to the competent quiz master who studies the duties of his position.

HOW TO STUDY.

I find that it adds much to the interest and value of the quizzes if a few words are spoken at each gathering, about how to study to advantage.

The following are a few of the points which can be brought out by such a method, and others will suggest themselves:

1. Advise them not to fall into the pernicious habit of neglecting some one or more studies. Nearly every student has preferences for some one branch of study and a corresponding dislike for others. It is best to place the same time on the more distasteful studies in order to keep up with the others. The most useful pharmacist is the one who has the best general idea of pharmacy in all of its details. Therefore, I never could fully appreciate the method followed at some colleges, of only awarding prizes for special excellency in some one branch of the entire line of study that goes to make up the pharmacist.

2. It is customary for the professors to state what books are required in each branch which is taught. In addition to this information, the quiz master can drop useful hints about the methods of studying the text-books, and what reference books are valuable. As a rule the students are slow to put money into books, and I think it is generally due to a well grounded fear that the books they select without advice often prove of but little value to them. If he is well posted, the quiz master can give some useful information on this point. I believe that not buying useful books is poor economy, especially for the student.

3. Explain the difference between diligent hard study and systematic application. But few college students of pharmacy know how to study, and they are always very thankful for advice on this point. Among other things I always advise them to employ the odd moments, such as going and coming to and from college in the street cars, by committing to memory tables of symbols, atomicities, atomic weights, and similar items in chemistry; formulas, specific gravities and other points in pharmacy; synonyms, natural orders, habitats, etc., in pharmacognosy; doses and antidotes in toxicology; definitions in botany, and the structure of drugs in microscopy. If all students will be as diligent in covering their shirt fronts, cuffs, etc., with data for street car use as some are in preparing for the final ordeal, they will never be at a loss for something to study.

4. A few words about taking notes will stimulate the indolent and encourage the diligent students. A student's note-books should be so complete that they not only assist for study in college days, but serve for reference in after years.

5. Encourage students to form quiz classes among themselves. Such classes, if properly conducted, in no way interfere with the regular quizzes, but serve to make the members better students.

6. Show students the necessity of reading one or more of the leading

pharmaceutical journals. The living literature of the times is contained in the current journals, and he who does not read those in his line need not expect to keep up with the advance of his fellow laborers who do. There is much common sense in the story about the stranger in a small town who went to the post-office and found out which one of the local doctors subscribed for the greatest number of medical journals, before he decided which physician to consult.

SPECIAL FOR THE JUNIOR CLASS.

It is well to consider the different demands of the junior and senior classes.

The new student requires much more attention in the way of explanation of the methods of study than is necessary with the members of the senior class. They should be thoroughly imbued with the fact that their time is precious and the junior lessons are foundation pillars for the senior work. I find that the juniors are liable to put off much work for the senior year that should be accomplished at once. Nor do they understand that the final examinations cover the ground work of the junior as well as the senior.

When the junior course closes, the majority of the class will resolve, mentally or otherwise, to do an immense amount of hard studying during vacation; but a very small proportion will carry out this determination. The amount of vacation work can be increased by advising the students not to undertake too much, or to put off commencing the work at once. If a young man, or woman, will lay out a limited amount of work governed by a definite plan, and commence it as soon as college closes, before the zeal lessens, the party will return in the fall a wiser and better student. It is the one who intends to learn the United States Pharmacopœia by heart, to know Remington's Practice of Pharmacy from cover to cover, to be able to describe all the drugs in Maisch's Organic Materia Medica from A to Z, but who takes a few weeks' rest before he commences the work, who comes back for the following session filled with sad regrets and full of a general dislike for all study.

SPECIAL FOR THE SENIOR CLASS.

One of the bugbears for the senior classes of most colleges is the thesis that is to accompany the application for graduation. Many of the students never saw a thesis, and know nothing about its natural order, habitat, etc. As the dictionary helps them out but little, the quiz master should come to the rescue. This will not only be highly appreciated by the students, but will lead them to write much better theses.

GENERAL RULES.

There are also a few general rules which it will be well to observe in conducting a quiz class. Among them are the following:

1. Never quiz on subjects not included in the lectures. It is sometimes advantageous to use methods of illustration differing from the ones followed by the lecturers, but it is not justifiable to add to the general scope laid out in the lectures.

2. Make it a rule to frequently repeat the name of the drug, chemical preparation, or other substance which is under consideration. The students will not all understand at first what you or the student quizzed is talking about, and this method of frequent repetition will inform him. Some persons may and undoubtedly do consider this a very trivial matter, but I know that a great majority of lecturers would impart more information to the students if they would take notice of this small item.

3. If a question is missed by several students at one quiz, do not neglect to bring it up at a subsequent meeting. The more legitimate questions asked that the students do not know, and the fewer on which they are well posted, the more benefit you will render the class.

4. At the last quiz before the holiday vacation, give the students some task to perform during that time. It will be a convenient opportunity for them to learn the symbols and atomicities of the elements, the source ot a list of drugs, the properties of a certain preparation, or other work which requires similar study. The students will not all follow out such instructions, but a sufficient number will reward you at the next meeting with the beam of satisfaction that lights the countenance of those who have accomplished a part, or all, of the task which they undertook.

5. Take pains to word questions in such a manner that they are intelligible to the students and will elicit direct answers. The student was not entirely at fault who, not thinking of sperm oil, in answer to the question, "What else besides spermaceti do we find in the big headed whale (*Physeter macrocephalus*)?" answered, "Brains." Nor was the young man who named one thousandth of a grain of strychnine when asked to name a safe dose. Still we must not expect to have satisfactory answers always given to even the most pertinent questions. I shall never forget the student who in answer to the question, "What is a sponge tent?" studied a moment and then said, "It must be the tents that the sponge-fishers live in on the sea shore."

6. Avoid questioning in such a manner that the wording or the voice will indicate the answer. Some students depend to a great extent on this failing on the part of all quiz masters who do not make an effort to guard against answering their own questions. Therefore, I seldom ask questions in such a manner that they can be answered by a simple "Yes" or "No."

7. Take special pains with students who have taken one or more courses in some other pharmaceutical college. The first few lessons they will find some difficulty in acquainting themselves with the new order of things, which is always encountered when a change is made from one in-

stitution to another. A little extra attention will set all right, and the new student will appreciate it.

8. Give the students some idea of the nature of the final examination by revealing some of the questions propounded on former occasions. If these are given near the end of the term, and in connection with a large number of similar questions which are liable to come up on examinations, they will do much good and no harm.

9. Keep order in the classes during the quiz. One student who does not pay attention to the questions, but makes a noise, will disturb many others who would otherwise profit by the quizzes.

10. If you make a mistake in explaining some point, do not try to ignominiously crawl out of it, but admit the error and go on with the work as if nothing had happened. This is the honorable course to pursue, and the one which will have the best effect on the class.

11. Never permit one student to prompt another who is attempting to answer. Unless a firm stand in this respect is taken at first, the practice will become troublesome and is at best demoralizing to the class. The quiz books which now flood the market should not be permitted in the class during quiz.

12. Before each quiz, look over the subject to be considered. A person may feel perfectly familiar with a subject, but unless he refreshes his memory each time, he will retrograde rather than advance as he should in his work. Remember that nothing succeeds like success.

GENERAL CONSIDERATIONS

To those who have the control of colleges of pharmacy and other similar institutions, I would say that I believe that the quiz class should be made obligatory and a record kept of the answers made, so that they can form a part of the final examinations. The arguments in favor of this, if properly presented, would require a special paper, but I believe that many of them are so self-evident that I can safely leave the suggestion as it stands.

There should be a quiz master for each branch that is taught, and the quiz classes should receive the moral support of the faculty and the executive support of the college authorities.

IN CONCLUSION.

What I have to say applies in a general way to all branches as taught in our modern colleges of pharmacy. There are, however, special features of each branch that must be taken into consideration, so that under the heading of "How to conduct a Quiz Class in Pharmacognosy" much more could be said.

The Section then adjourned until Thursday morning.

Third Session.—Thursday Morning, June 27th.

Chairman Painter called the session to order at 9 o'clock.

On motion of Mr. Kennedy the reading of the minutes was dispensed with.

Two papers on maize oil were read by Mr. Kennedy and Mr. Heinitsh.

ON MAIZE OIL.

Query 22.—A further consideration of Maize Oil. Can it be advantageously employed in Pharmacy in place of Cotton Seed Oil, or other oils now in use?

BY GEORGE W. KENNEDY.

In response to query No. 22, the acceptor, after some reflection, concluded to deviate a little from the query by furnishing some information regarding the extraction of the oil, its properties, cost, etc., which to some may not be new and uninteresting, while by others it will be listened to and read with interest and benefit.

J. U. Lloyd, in a paper read before the Ohio State Pharmaceutical Association, 1888, says: "It has been found in the making of starch, and perhaps in other directions as well, that it is desirable to get rid of the germs of the corn, as for reasons that it is unnecessary for me to mention, this germ is objectionable in these manipulations.

"In order to accomplish the last result, a machine has been devised that degerminizes the corn, throwing the hard, starchy part of the corn in one direction, and separating the germs in another, and this method can be and is applied to the making of starch in large quantities, and is found to be of great assistance and advantage. Naturally, there was an accumulation of these excluded germs, which, as is well known, constitute a considerable proportion of the corn, and they became a by-product. They were found to be valuable as a feed for stock, but really were too "rich" for such purposes, containing, as they did, a large amount of oil, the oil of the corn being almost altogether found in the germ. In order to render this material more acceptable as a feed for stock, a company was recently established for the purpose of squeezing the fixed oil from the germs, and thus improving the feed meal. A plant was established a few months ago (the only one in existence now, I learn) in the city of Cincinnati, for this purpose, and is now in operation. The method is very simple. The germs are conveyed from the factories, and are first purified by separating from them a considerable amount of bran or husk of corn that adheres to or is mixed with them. They are then steamed under pressure, so as to soften them, after which in the usual manner, by means of hydraulic presses, the oil is squeezed from them. The process is a very simple one, and yields an oil cake which, when ground into meal, is found to be exceedingly valuable as a feed for stock, the manu-

facturers claiming that it is superior to corn meal that is made from the whole corn. Thus it is that in addition to the oil cake, which is the prime object of the industry, there is an accumulation of the fixed oil. Inasmuch as the industry that yields this oil, in course of time, promises to increase, and the oil to be obtained in unlimited amounts, car-load lots or otherwise, it is not probable that the output will ever be less than the demand. It is peculiarly of necessity an American production, and will always, probably, be at our command. In car-load lots it can be had at 40 cents per gallon."

Prof. Charles O. Curtman, of St. Louis, has determined its character as follows:

"Oil from embryo of Indian corn in unrefined state has a specific gravity of 0.916 at 15°C., which is nearly that of pure olive oil (0.915 to 0.918). The elaidin test shows the presence of a large quantity of olein, intermediate in quantity between olive and cotton seed oils. Its color is pale yellow-brown; its odor and taste that of freshly ground corn meal. It belongs to the non-drying group of the vegetable oils, experiments showing that a very thin layer on paper does not, in three weeks' time, form a pellicle on the surface exposed to air. In this respect it closely resembles the oils of olive, almond, colza, rape-seed, etc. It does not very rapidly become rancid by exposure to air, and in this regard compares favorably with the best oils. Its use produces no specific purgative effect any more than olive oil."

Analysis by F. Williams, Liverpool, Eng.:

Fatty acids (free)	0.88
Total fatty acids	96.70
Unsaponifiable, mucilaginous and albuminous bodies	1.34

The sample is a non-drying oil, and very easy of saponification. Being in a crude state, direct from the mill, I have subjected a portion of the oil to a process of purification or refining, finding the loss sustained to be a little over four per cent.

I am satisfied, from the results obtained by other experimenters as well as my own, that corn oil is by far more applicable in pharmacy than cotton-seed oil. It saponifies readily without separation, and even after standing a considerable time, separation was not perceptible, which is not the case with cotton-seed oil. As its saponification is quite difficult with either lime or ammonia, a very unreliable preparation was obtained in Linim. Plumbi. Not one of these preparations was found to be permanent when made with cotton-seed oil, by the writer.

The oil used in conducting my experiments was obtained through the kindness of Prof. J. U. Lloyd. It is of a bright yellow-brown color, bland, about as thick as olive oil, has a slight characteristic odor of fresh corn, and a sp. gr. of 0.923 at 60° F.

With the view of answering the query in a satisfactory manner, I decided to make all of the preparations in which a fixed oil is used, substituting maize oil for cotton seed or other fixed oil.

The following fifteen offiinal preparations embrace all in which I experimented: Ceratum Camphoræ, Ceratum Cetacei; Charta Cantharidis, Collodium flexile; Emp. Ammoniaci cum Hydrargyro, Emp. Hydrargyri, Emp. Plumbi; Linimentum Ammoniæ, Linimentum Calcis, Linimentum Camphoræ, Linimentum Plumbi Subacetatis, Linimentum Sinapis Comp.; Unguentum Aq. Rosæ, Ungt. Diachylon, Ungt. Hyd. Nit.

CERATUM CAMPHORÆ.

Camphor liniment (made with corn oil), three parts	3
Corn oil, twelve parts	12
Cerate, eighty-five parts	85
To make one hundred parts	100

Mix the camphor liniment and the corn oil, and incorporate the cerate. The substitution is a decided improvement in this preparation, as it is free of the disagreeable odor of olive oil, which is frequently noticed in the old formula.

CERATUM CETACEI.

Spermaceti, ten parts	10
White wax, thirty-five parts	35
Corn oil, fifty-five parts	55
To make one hundred parts	100

Melt together the spermaceti and wax, then add the corn oil, previously heated, and stir the mixture constantly until cool. The use of corn oil in this preparation is also an improvement over the officinal, as it is free of any unpleasant odor, and is bland and pleasant.

CHARTA CANTHARIDIS.

White wax, eight parts	8
Spermaceti, three parts	3
Corn oil, four parts	4
Canada turpentine, one part	1
Cantharides, in No. 40 powers, one part	1
Water, ten parts	10

Mix all the substances in a tinned vessel and boil gently for two hours, constantly stirring. Filter through a woolen strainer, without expressing, and by means of a water bath, keep the mixture in a liquid state, in a shallow, flat-bottomed vessel with an extended surface. Coat strips of sized paper with the melted plaster, on one side only, by passing them successively over the surface of the liquid, and cut the strip when dry in-

to rectangular pieces. These papers are equal, both in activity and appearance, to the officinal, and the corn oil is therefore a good substitute.

COLLODIUM FLEXILE.

Collodium, ninety-two parts	92
Canada turpentine, five parts	5
Corn oil, three parts	3
To make one hundred parts	100

Mix them and keep the mixture in a well-stopped bottle. This preparation is as satisfactory as when made up with castor oil.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO.

Ammoniac, seven hundred and twenty parts	720
Mercury, one hundred and eighty parts	180
Corn oil, eight parts	8
Sublimed sulphur, one part	1
Dilute acetic acid, one thousand parts	1,000
Lead plaster, a sufficient quantity.	
To make one thousand parts	1,000

Digest the ammoniac in the diluted acetic acid, in a suitable vessel, avoiding contact with metals, until it is entirely emulsionized: then strain and evaporate the strained liquid by means of a water bath, stirring constantly, until a small portion taken from the vessel hardens on cooling. Heat corn oil and gradually add the sulphur, stirring constantly until they unite; then add the mercury and triturate until globules of the metal cease to be visible; next add gradually the ammoniac while yet hot; and finally, having added enough lead plaster previously melted, by means of a water-bath, to make the mixture weigh one thousand (1,000) parts, mix the whole thoroughly. The substitution in this case also proved satisfactory.

EMPLASTRUM HYDRARGYRI.

Mercury, thirty parts	30
Corn oil, ten parts	10
Resin, ten parts	10
Lead plaster, fifty parts	50
To make one hundred parts	100

Melt the corn oil and resin together, and when the mixture has become cool, rub the mercury with it until the globules of the metal cease to be visible; then gradually add the lead plaster, previously melted, and mix the whole thoroughly. The use of corn oil in this preparation gave perfect satisfaction, the globules of mercury being completely extinguished, and consequently the plaster good.

EMPLASTRUM PLUMBI.

Oxide of lead, in very fine powder, thirty-two parts	32
Corn oil, sixty parts	60
Water, a sufficient quantity.	

Rub oxide of lead with one-half of the corn oil, and add the mixture to the remainder of the oil contained in a suitable vessel of a capacity equal to three times the bulk of the ingredients. Then add ten (10) parts of boiling water, and boil the whole together until a homogeneous plaster is formed, adding from time to time, during the process, a little water, as that first added is consumed. Lead plaster thus prepared is pliable and tenacious, free from greasiness or stickiness, and is entirely soluble in warm oil of turpentine which shows the absence of uncombined oxide of lead. This plaster, made according to the above formula, gave perfect satisfaction; the only noticeable difference being in color, which was very much darker than the officinal.

LINIMENTUM AMMONIÆ.

Water of ammonia, thirty parts	30
Corn oil, seventy parts	70
To make one hundred parts	100

Mix together with agitation.

Oil of corn seems to be particularly adapted in the making of this liniment. The preparation is very satisfactory, producing a beautiful creamy and permanent liniment. Cotton seed oil, in my hands, has always been very unsatisfactory, and practically a failure.

LINIMENTUM CALCIS.

Solution of lime, fifty parts	50
Corn oil, fifty parts	50
To make one hundred parts	100

This preparation was equally as satisfactory as the Linimentum Ammoniæ, being smooth and of a good consistence.

LINIMENTUM CAMPHORÆ.

Camphor, twenty parts	20
Corn oil, eighty parts	80
To make one hundred parts	100

Dissolve the camphor in the oil at a moderate heat. Camphorated oil prepared with corn oil is unobjectionable.

LINIMENTUM PLUMBI SUBACETATIS.

Solution of subacetate of lead, forty parts	40
Corn oil, sixty parts	60
To make one hundred parts	100

Mix them by frequent agitation.

This yields a yellowish-white emulsion, which does not separate on standing, but gradually stiffens. The corn oil can be used to advantage in this preparation.

LINIMENTUM SINAPIS COMPOSITUM.

The substitution of corn oil for castor oil in this preparation is very unsatisfactory, as the corn oil is insoluble in the alcohol used, which produces a very unsightly product.

UNGUENTUM AQUÆ ROSÆ.

Corn oil, fifty parts	50
Spermaceti, ten parts	10
White wax, ten parts	10
Rose water, thirty parts	30
To make one hundred parts	100

Melt together by means of a water-bath the oil, spermaceti and wax. Then gradually add the rose water and stir the mixture constantly while cooling.

The corn oil seems to be admirably adapted in preparing this ointment, as it produces a beautiful, smooth, rich-looking salve. The only difference between this and the officinal is in color, the latter being of a pure white, the former of a very light straw color.

UNGUENTUM DIACHYLON.

Lead plaster, prepared with corn oil, sixty parts	60
Corn oil, thirty-nine parts	39
Oil of lavender, one part	1
To make one hundred parts	100

Melt together the lead plaster and corn oil at a moderate heat, then, having permitted the mass to become partly cool, incorporate with it the oil of lavender, and stir constantly until cool.

The only objection I know to this formula is the darker color of the ointment.

UNGUENTUM HYDRARGYRI NITRATIS.

Mercury, seven parts,	7
Nitric acid, seventeen parts	17
Corn oil, seventy-six parts	76

Heat the corn oil in a glass vessel to a temperature of 70° C. (158° F.), then add, without stirring, seven (7) parts of nitric acid. Continue the heat so long as a moderate effervescence continues, and allow the mixture to cool. Dissolve the mercury in the remainder of the nitric acid with the aid of sufficient heat to prevent the solution from crystallizing. Add this solution to the mixture before it has become entirely cold, and mix them thoroughly, avoiding the use of an iron spatula.

This preparation, made as above, is satisfactory, excepting that it does not become as thick as the officinal.

In answering Query No. 22, I would say that corn oil can be used in nearly all cases where other fixed oils enter as one of the component parts of the preparation; in some formulas with better results, others equally as good, and a few not so good, as this paper has proven.

MAIZE OIL.

BY CHAS. A. HEINITSH.

Maize oil, in the days of the old way of making whiskey, was found floating on the top of the mash in the mash tubs, and was a source of much annoyance to the distillers, as it had to be ladled off the mash, (the only way then of riddance), consuming much valuable time in the process of fermentation. Its only known uses at that time were for lighting purposes and for lubricating heavy machinery. Since the introduction of Mowery's Patent Degerminator, it is made from the germ or eye of the corn, either by heat directly applied, or by steaming the germ, and then subjecting the germ to great pressure in hydraulic presses, in the same manner as flax and cotton-seed oils are made, and then conveyed into containers and allowed to settle, or strained or percolated into barrels ready for the market. No chemicals are used for the purpose of clarifying or bleaching the oil.

Can maize oil be advantageously employed in pharmacy in place of cotton-seed or other oils now in use? is the twenty-fifth query on the list. The writer is unable to give a positive affirmative answer to this question. Yet the few experiments which have been made with a limited quantity of oil, with a view of stimulatlng experiments by others who have resources for obtaining a supply of the oil, and testing its propertie·, and then definitely stating the arguments *pro* and *con*, seem to indicate that it can be advantageously employed. Experiments with the liniments were first tried.

Linimentnm Ammoniæ, or volatile liniment, two parts of maize oil and three parts of Aq. Ammoniæ, U. S. P., by measure, makes a soft, creamy liniment, retaining its consistence, does not cake or become thick, as when mixed with olive oil, or separate as when mixed with cotton-seed oil, retains its color and all its stimulating and rubefacient qualities, is cheaper for this purpose than olive, cotton seed or flax-seed oils, and the odor no more objectionable.

Linimentum Calcis, made with maize oil in the proportions ordered by the U. S. P., retains its first consistence longer than cotton seed, and after a time, though much less than if made with cotton-seed oil, separation occurs.

Linimentum Plumbi Subacetatis made in the same proportions according to the U. S. P., retains its white color, separates only slightly after having been made for ten or twelve days, and is unlike that made from cotton-seed oil, which separates freely and changes color, and on this account its use is objectionable, for the reason that persons using it are liable to think it is spoiled, by reason of these chemical changes.

Unguentum Diachylon made with maize oil, is of good consistence, (about the same as with olive oil), and retains it through the varying temperature of the store.

Ung. Hydrargyri Nitratis made with maize oil alone, or one part lard and three parts oil, retains a soft, ointment consistence, not becoming hard and friable, as when made with olive oil, or olive oil and lard, (U. S. P., 1860,) or lard oil, and does not lose its citron-yellow color as readily.

Emplastrum Plnmbi, made with the same proportions of oxide of lead, maize oil and water, makes a plaster as readily as with olive oil, of the same consistence, but a little darker in color.

If in the further investigation of the properties of maize oil, the above few experiments are verified and others are made, this being a home product, obtainable in almost unlimited quantities, and being cheaper than foreign olive, or any other known vegetable oil, it would recommend itself to the next pharmacopœial convention to be made officinal.

MR. KENNEDY.—Corn oil in unguentum hydrargyri nitratis, is of advantage. When other oils are used the ointment becomes dry and hard, and very difficult in time to work up.

MR. HEINITSH.—Mr. Mowery told me they were putting up a mill now in New York City which will have a capacity of sixty thousand bushels of corn a day. Out West they have mills. The oil should be sold at thirty cents a gallon, though the price now is forty cents a gallon.

MR. KENNEDY.—I don't think the taste or slight odor of corn would be objectionable to some. The oil remains perfectly sweet I don't know how long. I received half a gallon from Mr. Lloyd, and it does not show the least sign of rancidity. In the linimentum plumbi, I think it can be substituted in place of other oils; it is much cheaper, makes it nicer, and remains perfectly sweet.

THE CHAIRMAN.—Do you know what becomes of this product now? You say thousands of gallons are produced.

MR. HEINITSH.—It is sent into New York to be mixed with olive oil. Cotton-seed oil has been so much used and talked about that they are avoiding it now, and are using maize oil. Mr. Mowery told me that they will have very soon a process by which it could be deodorized, and that it can then be used in place of olive oil. I had some in

a wide-mouthed ounce bottle for twenty-six days standing in the sun, and I did not notice any change.

Mr. Ebert.—Maize oil has been to me a query since 1874. It has been the objectionable feature in the manufacture of whiskey or alcohol, and in the manufacture of glucose. In 1874, when taking up the manufacture of glucose, I tried to remove this oil from the corn, first in an experimental way, and second on a large scale. I found that corn contains from seven to eight per cent. of maize oil, the yellow corn containing a somewhat larger quantity than the white corn. This percentage was obtained by using solvents like petroleum benzin, bisulphide of carbon and ether, and they all indicated about the same percentage. I made a number of tests with this oil as to what effect it would have on the human system. I found that when it was extracted by any of those solvents, it produced quite an irritation of the bowels, sometimes inflammation, and that was the reason why I came to the conclusion that it was of no particular value as an admixture to other oils that might be taken internally; but it soon became known that it was an excellent drying oil, and it has been manufactured for many years and used with linseed oil or in place of linseed oil. A very large quantity of the linseed oil of the market for years was mixed with maize oil or corn oil, which was very much cheaper. For the last ten years the brewers have been using corn in place of rice. Rice has their preference; but when it was very expensive they would use corn under the names of cerealin, grits, etc., or ground hominy. These have been very largely used. Within the last three or four years a process of degermination has been devised. Mr. Mowery has recently made an apparatus by which the germ, in which the largest proportion of the oil exists, can be removed and a grits produced which is equal, if not superior to rice. The very point that Mr. Heinitsh brings up, that it is going to be manufactured in very large quantities, is due to this: this grits is being used now by nearly every brewer in the country as a substitute for barley. They use a certain percentage of barley with this grits, which is now nothing else but starch and cellulose, the germ and the external layers having been removed. This will also be used by the distillers and by starch manufacturers. It will be used as food, being deprived of this objectionable oil germ and the epidermis. I would like to ask Mr. Kennedy or Mr. Heinitsh whether they have any knowledge what the percentage of oil is that is obtained from this germ.

Mr. Heinitsh.—There is eleven per cent. of oil contained in the germ. After the oil is expressed the germ is sold for feed, and that pays for all the expenses of expressing the oil. They make three grades of corn: first the coarser is run through a No. 18 sieve, which is used for whisky; the No. 22 or 24 is used by brewers for beer; the finely powdered is sent to New York and is said to be used for mixing with powdered sugar. They claim that a bushel of corn ground that way will yield twenty-eight pounds of starch, four pounds more of starch per bushel than the old process—so the starch makers are using it very extensively.

Mr. Ebert.—I think that it is very important that we should investigate this oil and see whether it is a proper oil for internal use. All the oil that I have tested which was extracted by solvents certainly was not; whether this was due to the solvents, or whether something was extracted by them that is not obtained by expressing the oil as it is done now, I do not know; but that very point should be investigated, so as to guard against something that might possibly be dangerous. For liniments and external uses no doubt the oil would have anwered the purpose. The petroleum ether was very difficult to remove, also the bisulphide of carbon; but the ether and chloroform were very easily dissipated, so that the oil was very bland; there was hardly any odor to it excepting what you might style a small percentage of the corn flavor.

Mr. Kennedy read the following three papers by Mr. McDonnell, which were accepted and referred:

MORRHUOL.

(*Extractum Olei Morrhuæ Alcoholicum.*)

BY S. A. M'DONNELL, PH. G., SAN FRANCISCO.

After all the use and abuse of cod liver oil, this town is now being worked in the interest of a French preparation called morrhuol. To quote from the brochure on the subject—a short resume of the process—which consists in treating the oil with alcohol (what kind?) at 90°: the alcoholic solution so obtained yields, on distillation, an amber-brown, bitter, aromatic liquid, partially crystallizing at the ordinary temperature, which is called morrhuol. The oil thus treated now resembles any ordinary animal oil (in other words, all the curative properties, therefore, must have been extracted by the above simple process). It is elsewhere explained that the light oil, so popular with the great multitude who resort to its use, is very weak in the percentage of the above product. Now my experience with most remedies of this class has been, that the cleverly devised method of bringing about the grand result desired, has been more or less a myth, not practical—the special machinery required only being in the hands of the benefactor of his race, whose sole desire is to become the great medium whence all suffering mankind may reap benefit, etc.—nevertheless I concluded to look into the subject a little.

First: the contents of five capsules were placed in a suitable receptacle, and some absolute alcohol added thereto. It dissolved one into the other perfectly. I had expected a failure in this respect; but as further experiments led me to the conclusion that it was an alcoholic extract, I proceeded to carry out the process as laid down in the pamphlet. In these experiments only the light oil was used.

1000 grains of oil was weighed out, and a like amount of actual alcohol, both placed in a very strong twenty-ounce bottle, the cork secured tightly; the bottle placed in a water bath, which was maintained at a temperature of about 90°, at intervals of several days. The contents were then removed, and after standing long enough for complete separation, the alcoholic solution was decanted, and the last portions of the same removed by means of a pipette. After allowing the alcoholic solution to stand awhile, 100 grains of it was weighed out, and allowed to evaporate spontaneously (free from dust). The extract weighed three and one-half grains, equal to 3.5 per cent.

The oil residue was then placed in a water bath—as it smelled strongly of alcohol—and heated to get rid of the alcohol; but such heat was only successful in that respect, as the odor and taste of cod liver oil were still present, which would indicate the process of distillation (as recommended) would not remove *all* the odor from the oil, although the alcoholic ex-

tract was richly charged with it. However, the assertions made regarding the process, as laid down in the paper, for preparing morrhuol, are tolerably well borne out; but as to the therapeutic value of it, I can say nothing. And, furthermore, as the preparation is not a difficult one to make, and on a large scale could be furnished (as the same alcohol could be used over and over again) at a reasonable price, would it not be well to give countenance to some such preparation as *Extractum Olei Morrhuæ Alcoholicum*, with a view of getting out of it anything there might be in it, from a medical standpoint; for should it possess the merit claimed for it, the smallness of the dose would be a very strong recommendation in its favor.

EXTEMPORANEOUS PREPARATION OF OLEATE OF MORPHINE.

BY S. A. M'DONNELL, PH. G.

Late one evening, some time ago, the following prescription was handed in:

℞. Morph. Oleat. 10% . . . . ʒi.
Sig.—Use as directed.

Dr. ——— ———.

with the remark—"Can you put this up?"

The party was answered: "Certainly; kindly be seated for a few moments." I soon realized I had none of such strength on hand. It was not expedient to send out for it, so nothing for it but to try and make it. 450 grains of oleic acid was weighed out, and about 53 grains of morph. sulph. (no alkaloid in stock)—the excess over 50 grains to allow for the difference between alkaloid and salt, in the amount of water of crystallization. The acid and morphine were placed on a water bath and heated; of course (unlike quin. sulph.) none apparently dissolved. So recourse was had to the *ammonia bottle*, out of which a few drops at a time was added at frequent intervals, and constant stirring until a clear solution resulted. This being rapidly cooled and no sediment appearing, so was dispensed, and I presume gave entire satisfaction; as *Hail Columbia*, electrically applied, would have followed a failure to *fill* the bill. I have since experimented with this method of preparing oleate of morphine, and can offer the following as yielding a very satisfactory product. For a 10% solution:

℞. Acid oleici . . . . gr. 450
Morphinæ sulphatis . . . . gr. 53

Mix, place on a water bath, apply heat, and add gradually aq. ammon. conc. minims 25, stirring constantly until a perfect solution takes place. Time—about 10 minutes in all. Some specimens of morph. sulph. may require a few drops more or less ammonia to effect a solution. The heat dissipates any free ammonia, while any possible resulting ammon. sulph. don't seem to show itself, nor is there any indication of the formation of

a soap in view of the nature of the combination. The mixture is apparently all that can be desired, and I can recommend the process to any one requiring oleate of morphine—the same not being kept in stock.

THE BEHAVIOR OF SOME NEW REMEDIES—(SO CALLED).

In contact with some of the more prominent acids of the shop.

BY S. A. M'DONNELL, PH. G.

REACTION OF SOME NEW REMEDIES—(SO CALLED).

In this paper, on several New Remedies (so called), an effort was put forth to ascertain if any very prominent behavior would result between them and some of the more common acids of the shop, as a means of identification under adverse circumstances.

H_2SO_4	Sulphonal, no change.	Phenacetine, no change.	Acetanilid, no change.	Salol, no change.	Antipyrine, no change.
HNO_3	" "	Lemon color, developing to an orange color.	" "	" "	Pale amber color, streaked with red.
Acid Nitro-Hydrochlor.	" "	Lemon color.	" "	" "	Amber color, yellowish streaked.
HCl	" "	No change.	" "	" "	No change.
$HC_2H_3O_2$ Glacial.	" "	" "	" "	" "	" "
H_3PO_4 conct.	" "	" "	" "	" "	" "
Fe_2Cl_6 Tinct.	" "	" "	" "	" "	Blood red color.
H_2SO_4 dilute heat and solut $K_2CrO_4CrO_3$	" "	Color darkened a little.	" "	Color darkened a little.	H_2SO_4 dilute and heat with crystal K_2CrO_4 CrO_3, color darkened some.

From which it will be seen that only two of the things show any particular change. Phenacetine and nitric acid show a reaction; and antipyrine and tincture of iron give a decided change, the former a lemon color and the latter a blood-red color. One grain of phenacetine in half a fluid dram of water, and five drops HNO_3 added (in a slender test tube) and heated to a boiling point, turns yellow (a portion of the phen-

acetine forming a globule of a deep orange color), the liquid becoming opaque, which, on cooling, congeals into a solid mass.

One grain of antipyrine in 500 minims of water, and one drop of tr. ferri chlor. (U. S. P.) added thereto, instantly produces a color not unlike that of good sherry wine.

For short:

Nitric acid conct. and phenacetine—yellow color.
Tr. ferri chlor. and antipyrine—blood-red color.

The following paper, read by Mr. Searby, was accepted and referred:

A POINTER IN DISPENSING.

BY S. F. HUGHES, PH. G., SAN FRANCISCO.

Every druggist appreciates the sense of embarrassment with which prescriptions applicable to delicate diseases are called for by the customer. The ruby blush of the cheek too often tells the secret before the timid lips can speak it; the gaudy and fashionable attire may allure or amaze the layman, but the little scrap of paper handed to the clerk by the customer bereaves the latter of his spirit of nonchalant audacity, and transforms him into a contrite creature, presenting his prescription, for which he richly pays, with an air of penitence intensified by an uncontrolled embarrassment of manner.

The writer was moved to these reflections a short time ago by a young man handing him a prescription as follows:

℞. Ung. hydrargyri . . . . ℥j.
Div. in chart. No. xx.
Sig.—Use as directed.

I determined to get out of the old way of preparing this prescription, and am happy to state that I was able to dispense it in one-third of the time heretofore required in the old process, by the adoption of the following method, which I can earnestly recommend to the use of the profession, it being very simple, but quite practical.

I first lay the ung. hyd. on a pill-tile and roll it into a long roll, adding plenty of lycopodium to keep it from sticking to the fingers, and cut it into twenty parts, using a heated spatula to avoid adhering.

Each piece is then rolled into a marble shape by placing it in the palm of the hand and, as stated above, using lycopodium *ad libitum*; the waxed paper being laid out on the counter, each piece when finished was dropped on the paper without adhering in the least. I then folded each and dispensed as usual.

It may be said that lycopodium does not affect the absorption of the mercury in the least.

Mr. Ebert read the following, which was accepted and referred:

NOTES ON OIL CONTAINED IN GROUND FLAXSEED OF THE CHICAGO MARKET.

BY W. A. PUCKNER.

Some time since a sample of ground flaxseed, stated to be East India, was given me, with the request that I estimate the amount of fixed oil contained in it. The percentage found, by exhausting with carbon disulphide, was so much larger than the statements of various text-books had led me to expect, as to lead me to examine several other samples, the results of which examination are herewith submitted:

The United States Pharmacopœia requires ground flaxseed to yield not less than 25 per cent. of fixed oil, when extracted with carbon disulphide.

Mr. G. M. Beringer, in the *American Journal of Pharmacy*, June, 1887, states that a sample examined by him yielded 31 per cent.; while Mr. Frank X. Moerck (*American Journal of Pharmacy*, December, 1887) obtained 33.5 per cent.

Seven samples of meal, all purchased at retail pharmacies in Chicago, were subjected to the following treatment: 5 gm. were exhausted in a Soxhlet extraction tube; the flask (Erlenmeyer's) containing the solution of oil in carbon disulphide placed on a water-bath, the CS_2 distilled off at a low temperature and the flask dried at 100° C., till it ceased to lose, or, rather, began to gain, in weight. The yield was:

No. 1	37.53 per cent.
No. 2	37.40 " "
No. 3	37.98 " "
No. 4	37.36 " "
No. 5	37.88 " "
No. 6	36.12 " "
No. 7	37.38 " "
Average	37.37 per cent.

Three possible errors, which might lead to such high results, occurred to me: 1st, impurities in the solvent could, perhaps, extract substances other than fixed oil; 2d, the heat employed in recovering the menstruum by distillation might lead to error, and, 3d, that exposure to the atmosphere, while in the drying oven, would, by oxidation of the oil, materially increase the yield. Five gm. of No. 2 were, therefore, exhausted with stronger ether, the solution evaporated spontaneously and dried as before—the result was 37.12 per cent.; to ascertain whether the heat employed in drying would materially increase the yield by oxidation, the flask, after ceasing to lose weight, was kept at a temperature of 100° C., for about two hours longer (the time usually consumed in drying) and the increase in weight noted—it amounted to less than 1-10 of 1 per cent.

From these experiments I conclude that the results obtained with carbon disulphide are fairly correct.

If the subject is considered of sufficient interest or importance, I should

be glad if other members of the Association would make similar estimations, thus giving the question a wider scope; or I will undertake to examine any specimens sent to me.

MR. SEARBY.—It seems to me the paper is incomplete without an analysis of the whole flaxseed found in the same locality, because then we would be able to see at a glance whether it was due to some foreign substance used as an adulterant or not.

The following paper read by Mr. Ebert was referred for publication:

THE DIVISION OF POWDERS.

BY E. B. STUART AND E. B. TAINTER, CHICAGO, ILL.

That the matter of accuracy of division of powders and pills has a considerable practical interest to pharmacists, none will deny. It does not, however, seem to have attracted much attention among the members of this Association, as no papers bearing on this subject have been presented to this Society since the one on Seidlitz powders, by Chas. W. Grassley, in 1872.

If the accompanying tables, which are based on the analysis of three prescriptions, each of which was dispensed by thirty-seven different individuals, be thought worth acceptance by this Association, the authors beg to offer the following explanations and criticisms:

The weighings were made on an analytical balance easily sensitive to one-fifth mg., and fractions of milligrams stated in the nearest whole number.

No less than five powders were weighed in any case, and usually the entire number were examined.

After removing the powder from the paper in which it was folded, the paper was carefully brushed over with a camel's hair brush, to avoid inaccuracies due to the adherence of particles to the paper.

The weight of the heaviest powder is stated in the first column, that of the lightest in the second, and the greatest deviation from the correct weight occupies the next, or third column. The sum of the weight of all of the powders weighed, divided by the number of powders weighed, gives the average weight in the fourth column, and the difference between the correct weight and the average weight so found is stated in grams and decimals in the fifth column, while this same difference is stated in per centum terms of the correct weight in the sixth column. The sixth column was the result of an after-thought, and the computations are not very accurate or systematic. At first all fractions were stated to one-half per centum, but as some averages within this quantity were met, closer statements were calculated later.

Inasmuch as the factors are given, by which this calculation can be made by any one who takes sufficient interest in the subject to do so, it was not thought worth while to construct a new table on this account.

It will be noticed by reference to the fourth column, which gives the

average weight, that most of the dispensers have lost some material. This would seem to be the normal direction of variation, as some powder will naturally adhere to the mortar, and if a pill-tile is used in the division of the material, a still further loss may occur. Seventeen exceptions, however, occur, namely: in table number one, numbers 10, 20, 21, 28, 31, 32 and 36; in table number two, numbers 22, 30, 31 and 37; and in table number three, numbers 3, 14, 16, 18, 22, 29 and 30 are in excess. This must be due to carelessness in weighing. The writers have observed that few pharmacists take the trouble and time to throw the balance off its balance in taking the weight of material, or to even adjust the quantity so that the pans are on the swing, *i. e.*, so that neither pan touches the rest. Unless this is done the quantity might as well be guessed at.

The average variation in table number one is 4.8 per cent.; in number two, 9.4 per cent., and in table number three, 9.45 per cent. This may be fairly considered to be representative, as it involves a total of over six hundred powders weighed. Fatality is not to be apprehended, even with potent remedies, from this source. Still, an average inaccuracy of 24 per cent., as met in number 24, table No. 3, is too much. It must be noted, however, in extenuation, that the quantity of material is small in this prescription.

The correct weight of each powder in table number three was taken as 333 milligrams. A deviation of one grain would amount to about 20 per cent. of this. It will be noticed in this connection that the average variation in this prescription is less than half a grain. The average variation in prescription number one is somewhat greater, although the powder being heavier, the percentage of variation is less; expressed in grains it would be equal to 7-9ths of a grain (48½ milligrams).

A column was prepared which showed the greatest variation in percentum terms of the correct weight, which, inasmuch as the same information was given in positive quantities in the third column, was omitted as occupying too much space.

As this average may be presumed to represent the largest single dose likely to occur from inaccurate division, a few of the worst are given :

Table No. 1. Individual No. 3, 22.27 per cent.; No. 4, 28.02 per cent.; No. 6, 22 per cent (nearly); No. 11, 22.77 per cent.; No. 14, 22.27 per cent.; No. 24, 20.9 per cent. (nearly); No. 36, 22.37 per cent.

Table No. 2. Individual No. 6, 23.4; No. 19, 22; No. 21, 22; No. 23, 35.2; No. 24, 29.6; No. 29, 20.4; No. 30, 22.2; No. 34, 23.4 per cent.

Table No. 3. Individual No. 4, 35.43 per cent.; No. 7, 35.4 per cent.; No. 38, 44 per cent.; No. 13, 32.13 per cent.; No. 19, 54.35 per cent.

The study of these powders with reference to the intimacy or evenness of mixture of the constituents has been entirely omitted. It was intended

to subject those of Prescription No. 1 to chemical test. The fact that ihe Association meets earlier than usual this year, has prevented this work.

PRESCRIPTION NUMBER ONE.

Ferric Oxide, 0.1 gram; Sugar, 10 grams.
Divide in 10 powders.
Each of the above powders should weigh 1.010 grams.

Number.	Greatest weight of a single powder.	Least weight of a single powder.	Greatest deviation from correct weight.	Average weight.	Average deviation from correct weight.	Average deviation from correct weight.	Number.	Greatest weight of a single powder.	Least weight of a single powder.	Greatest deviation from correct weight.	Average weight.	Average deviation from correct weight.	Average deviation from correct weight.
	Grams.	Gms.	Gms.	Grams.	Grams.	Per ct.		Grams.	Gms.	Gms.	Grams.	Grams.	Per ct.
1	1.082	.823	.187	.960	.050	5	20	1.177	.940	.167	1.041	+ .031	+3
2	1.073	.802	.208	.941	.069	6 4/5	21	1.137	.999	.127	1.079	+ .069	+6 4/5
3	1.040	.786	.224	.940	.070	6 9/10	22	1.115	.880	.130	.992	.018	1 4/5
4	1.065	.727	.283	.964	.046	4½	23	1.014	.825	.185	.952	.058	5½
5	1.124	.837	.173	.986	0.24	2 3/10	24	1.170	.799	.211	.961	.039	3 4/5
6	.908	.788	.222	.894	.116	11½	25	1.010	.934	.076	.963	.047	4½
7	1.020	.948	.062	.988	.022	2	26	1.010	.864	.146	.963	.057	5 3/5
8	1.042	.868	.142	.960	.050	4 9/10	27	1.040	.870	.140	.956	.054	5¾
9	1.018	.820	.190	.951	.059	5 4/5	28	1.140	.925	.076	1.025	+ .015	+1½
10	1.182	.990	.172	1.071	+ .061	+6	29	1.080	.902	.108	.995	.015	1½
11	1.070	.780	.230	.953	.057	5½	30	1.130	.852	.158	.998	.012	1
12	1.024	.890	.120	.979	.031	3	31	1.100	.972	.100	1.052	+ .042	+4
13	1.030	.780	.230	.919	.091	9	32	1.110	.900	.110	1.010	0	0
14	1.126	.785	.225	.789	.221	21 4/5	33	1.132	.870	.140	.967	.043	4½
15	1.032	.877	.133	.948	.062	6	34	1.007	.857	.153	.938	.072	7
16	1.035	.873	.137	.964	.046	4½	35	1.067	.902	.108	.971	.039	3 4/5
17	1.013	.944	.066	.966	.044	4 3/10	36	1.237	.842	.226	1.014	+ .004	+2/5
18	1.020	.868	.142	.940	.070	7	37	1.128	.935	.118	.985	.025	2½
19	1.005	.830	.180	.934	.076	7½							

PRESCRIPTION NUMBER TWO.

Dover's powder, 3 grams.
Divide in six powders.
Each of the above powders should weigh .500 grams.

Number.	Greatest weight of a single powder.	Least weight of a single powder.	Greatest deviation from correct weight.	Average weight.	Average deviation from correct weight.	Average deviation from correct weight.	Number.	Greatest weight of a single powder.	Least weight of a single powder.	Greatest deviation from correct weight.	Average weight.	Average deviation from correct weight.	Average deviation from correct weight.
	Grams.	Gms.	Gms.	Grams.	Grams.	Per ct.		Grams.	Gms.	Gms.	Grams.	Grams.	Per ct.
1	.568	.410	.090	.479	.021	4	20	.540	.455	.045	.487	.013	2½
2	.540	.405	.095	.484	.016	3	21	.502	.390	.110	.433	.067	13
3	.562	.420	.080	.491	.009	1⅘	22	.566	.469	.066	.502	+.002	+⅖
4	.513	.432	.068	.479	.021	4	23	.500	.334	.176	.458	.042	8½
5	.522	.435	.065	.475	.025	5	24	.550	.352	.148	.496	.004	⅘
6	.482	.383	.117	.432	.068	13½	25	.538	.438	.062	.494	.006	1⅕
7	.545	.400	.100	.474	.026	5	26	.530	.447	.053	.496	.004	⅘
8	.510	.470	.030	.484	.016	3	27	.545	.425	.075	.494	.006	1⅕
9	.563	.422	.078	.483	.017	3½	28	.513	.410	.090	.449	.051	10
10	.533	.440	.060	.481	.019	4	29	.500	.398	.102	.457	.043	8½
11	.585	.408	.092	.484	.016	3	30	.554	.489	.111	.514	+.014	+2⅘
12	.501	.417	.083	.479	.021	4	31	.520	.423	.077	.515	+.015	+3
13	.500	.347	.053	.417	.083	16½	32	.468	.429	.071	.455	.045	9
14	.484	.460	.040	.434	.066	13	33	.485	.424	.076	.454	.046	9⅕
15	.500	.420	.080	.464	.036	7	34	.520	.383	.117	.454	.046	9⅕
16	.503	.465	.035	.491	.009	1⅘	35	.560	.413	.087	.503	+.003	+⅗
17	.520	.402	.098	.463	.037	7	36	.557	.418	.082	.449	.051	10⅕
18	.480	.440	.060	.458	.042	8½	37	.583	.528	.083	.557	+.043	+8½
19	.560	.390	.110	.482	.018	3½							

PRESCRIPTION NUMBER THREE.

Powdered Rhubarb; Magnesia; of each, 2.5 grams.
Divide in fifteen powders.
Each of the above powders should weigh .333 grams.

Number.	Greatest weight of a single powder.	Least weight of a single powder.	Greatest deviation from correct weight.	Average weight.	Average deviation from correct weight.	Average deviation from correct weight.	Number.	Greatest weight of a single powder.	Least weight of a single powder.	Greatest deviation from correct weight.	Average weight.	Average deviation from correct weight.	Average deviation from correct weight.
	Grams.	Gms.	Grams.	Grams.	Grams.	Per ct.		Grams.	Gms.	Gms.	Grams.	Grams.	Pr.ct.
1	.323	.214	.119	.281	.052	15½	20	.320	.296	.037	.305	.028	8½
2	.383	.285	.050	.327	.006	1$\frac{8}{10}$	21	.388	.268	.065	.332	.001	⅓
3	.357	.277	.056	.298	.035	10½	22	.350	.320	.017	.336	+.003	+1
4	.303	.215	.118	.260	.073	22	23	.293	.204	.129	.252	.081	24
5	.345	.278	.055	.308	.015	4½	24	.369	.295	.038	.318	.015	4½
6	.322	.272	.061	.301	.032	9½	25	.337	.302	.031	.322	.011	3⅓
7	.352	.215	.118	.294	.039	11½	26	.364	.309	.031	.325	.008	2½
8	.347	.205	.128	.263	.070	21	27	.350	.273	.060	.309	.024	7
9	.355	.265	.068	.290	.043	13	28	.282	.220	.113	.272	.051	15
10	.360	.273	.060	.323	.010	3	29	.360	.320	.027	.335	.003	+1
11	.362	.262	.061	.294	.039	11½	30	.358	.328	.025	.340	.007	+2
12	.335	.289	.040	.301	.032	9½	31	.393	.283	.060	.323	.010	3
13	.303	.226	.107	.256	.077	23	32	.356	.273	.050	.318	.015	4½
14	.400	.290	.067	.340	+.007	+2	33	.328	.280	.053	.320	.013	3½
15	.320	.235	.098	.274	.059	17½	34	.340	.217	.116	.272	.051	15
16	.400	.288	+.067	.345	+.012	+3½	35	.323	.265	.068	.285	.048	14½
17	.351	.267	.066	.307	.016	5	36	.373	.256	.077	.317	.016	5
18	.399	.314	.066	.366	+.033	+10	37	.322	.206	.127	.266	.067	20
19	.274	.252	.181	.259	.074	22							

MR. HALLBERG.—I would like to say in connection with this subject that there is a method for dividing powders, which, while perhaps not new, is not very often used. I believe it was recently proposed in New York. No matter what the quantity or the bulk of the powder is, when a certain amount is to be divided in eight powders, it is recommended to just halve it on the scale successively until you get down to the single powder. Now, there you get a more absolutely accurate division than you can by any other means; and wherever the number of powders is small and the number can be evenly divided, I think that is a very good plan to pursue.

MR. RAMSPERGER.—That is the method employed fifty years ago in my apprenticeship.

MR. SEARBY.—The number would of course have to be a multiple of two.

Mr. Stevens read the following, which was accepted and referred:

EXAMINATION OF FABIANA IMBRICATA.

BY M. ROCKWELL.

School of Pharmacy, University of Michigan.

EXAMINATION OF FABIANA IMBRICATA (PICHI).

Synonym, Pichi.
Part Employed, Leaves and stem.
Natural Order, Solanaceæ.
Habitat, South America.

*Uses.** Pichi is especially efficacious in diseases of the urinary apparatus and of the liver. In cases of vesical catarrh, acute or chronic, following a mechanical cause, such as gravel or calculus, or uric diathesis, this remedy will quickly modify the urinary secretions, calm the irritability, and favor the expulsion of the gravel and calculi that can be passed through the urethra. It also modifies and cures chronic purulent mucous secretions. Its action on the affections of the liver must be attributed to its diuretic properties, though it is recommended for hydropsy and dyspepsia, due to insufficient biliary secretions; but the specific action of pichi is directed without doubt upon the organs of the urinary apparatus. It is used in the form of a fluid extract in a dose of four (4) to six (6) spoonfuls per day in cold or warm water.

Description:† Pichi is a small shrub, about six (6) feet high, frequently met with in Chili and Argentine Republic, where it grows spontaneously and is also used as an ornamental shrub. Its many small branches are covered with broadly ovate, very thick leaves, about one-twelfth of an inch in length, the bases and margins of which are coated with a whitened, resinous deposit. The resin-like odor, arrangement of leaves, and the general aspect, seem to classify it with the family of coniferæ; but on examination of the few white flowers which we find at the extremity of the branchlets, in the second year, it is to be placed in the natural order Solanaceæ, sub-order Curvembriæ, and tribe Nicotineæ.

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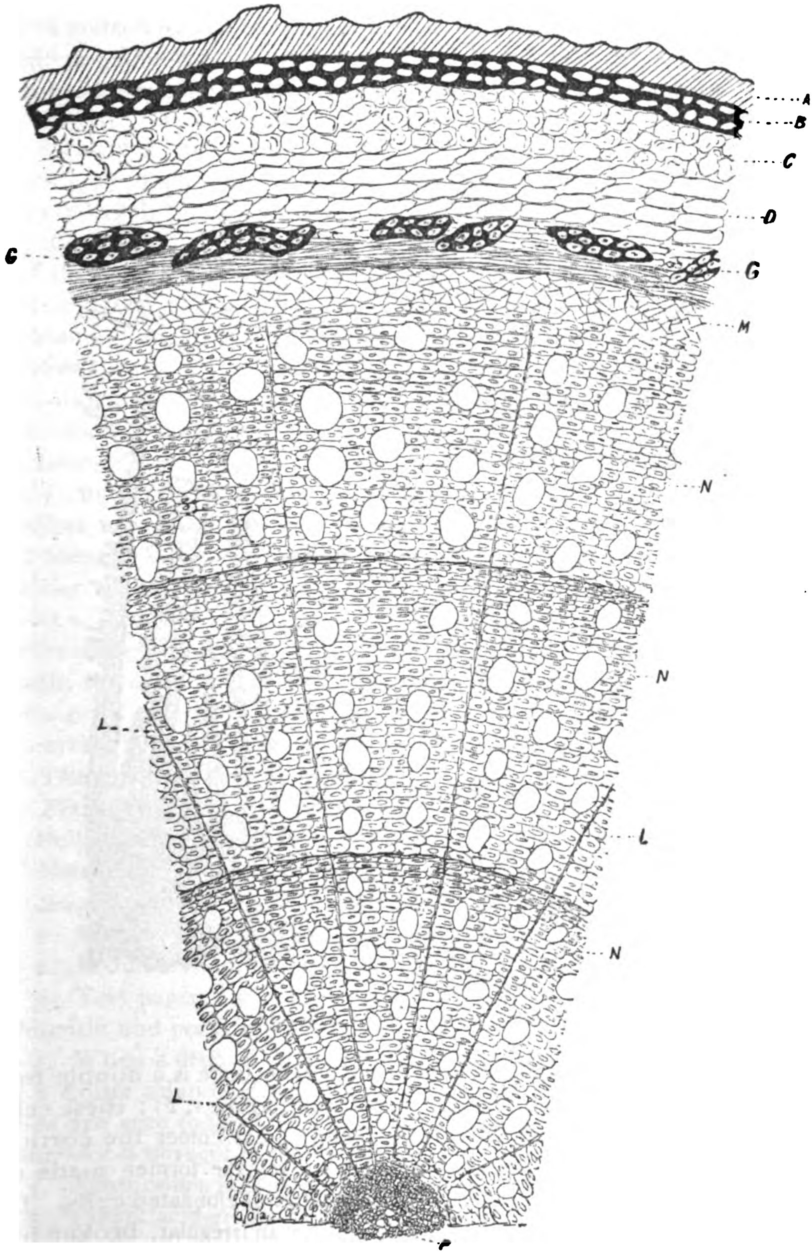
* Medical Age, 1886, IV, 118.

† Dr. Henry Rusby, Therapeutic Gazette, [3], I, 810; Medical Age, 1886, IV, 118.

The wood is of a uniform yellowish color, heavy, hard and very fine grained. The relatively thin bark is of a light gray color, finely rough-

FIGURE I.

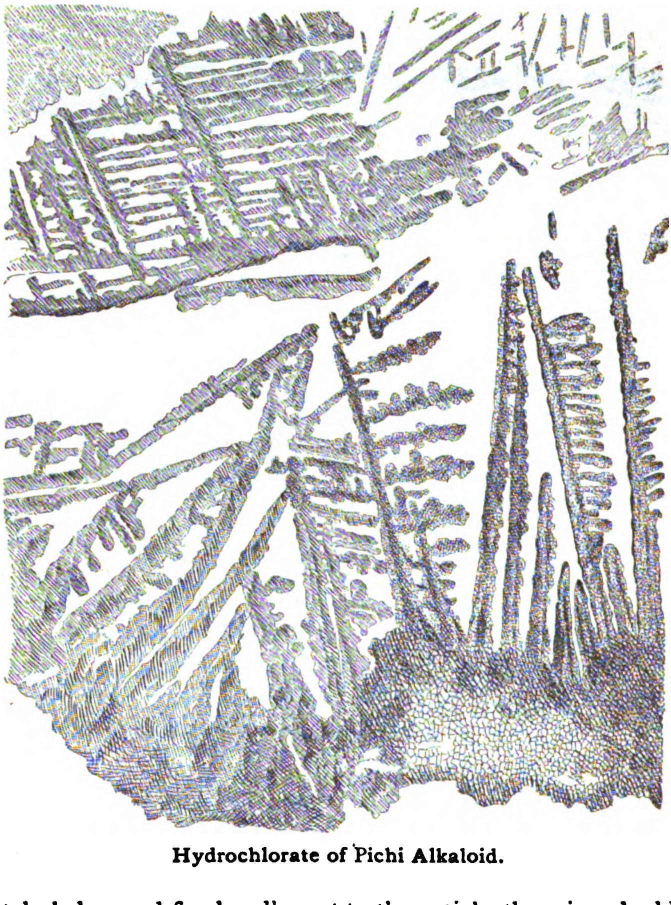


Section of Pichi Stem.

ened by small, short, sharp, longitudinal ridges, which exhibit under the lens a peculiar resinous lustre.

As Parke, Davis & Co., of Detroit, Mich., were kind enough to furnish me with samples of the drug, I have been able to make a microscopical and chemical examination of it. A microscopical examination of a cross section of the stem shows but few irregularities. Beginning at the surface (see figure 1, *a*), we find first a thick, highly colored cuticle. Im-

FIGURE 2.



Hydrochlorate of Pichi Alkaloid.

mediately below and firmly adherent to the cuticle there is a double row of elliptical cells with thick, highly colored walls (figure 1, *b*); these cells correspond to the epidermis in a typical stem. Next comes the corticle (figure 1, *c*) and corticle parenchyma (figure 1, *d*), the former made up of nearly cubical cells with thick walls; the latter of elongated cells. Intermingled with the corticle parenchyma, there is an irregular, broken line of cells, the phloëm (figure 1, *g*). Between the phloëm and xylem, or

wood proper, there is very fine fibrous appearing structure, entirely wanting in some parts of the stem. This is undoubtedly the imperfect cambium layer (figure 1, *m*).

The xylem (figure 1, *n*) constitutes by far the largest part of the stem, and is made up of two kinds of cells: the large empty ducts or vessels, and the thick-walled fibrous tissue. The latter, in cross-section, has the appearance of sclerenchyma cells, so thick are the cellulose walls. The medullary rays are made up of a single layer of flattened parenchyma tissue reaching from the pith to the cambium (figure 1, *l*). The pith (figure 1, *p*) forms only a small part of the stem, and is made up of small, quite loosely arranged cells.

Chemical Examination.—By treating one hundred and fifty (150) grams of the finely powdered drug with seven hundred (700) cubic centimeters of Prollius' solution, and allowing it to stand twenty-four hours, I obtained an ethereal liquid, from which acidulated water removed a substance that is precipitated by the general alkaloidal reagents. This substance was purified as much as possible by repeatedly shaking it out in chloroform, ether and acidulated water. The resulting .01 gram of substance was a slighty brown, non-crystalline bitter principle, capable of forming crystalline salts. Two of these salts were prepared, their crystalline form studied microscopically, and photographs and drawings made of them. (Figure 2, Hydrochlorate of the substance.) Attempts to crystallize the sulphate did not prove satisfactory. The chloroformic solution of the free alkaloid when evaporated to dryness emits a peculiar offensive odor; after being heated for about one-half an hour on a water bath, the odor had entirely disappeared, and there was a loss of weight of 0.0013 gram. Whether the loss is due to some volatile impurity or to a certain volatility of the alkaloid was not determined.

The qualitative reactions of the alkaloid are as follows:

First. On the free alkaloid in solid form:

Sulphuric acid dissolves it, producing a dark-yellow solution.

Nitric acid dissolves it, producing light-yellow solution.

Second. Reactions of solutions of the salts of the alkaloid:

1. Mayer's reagent gives a white amorphous precipitate.
2. Bromine water gives a dirty white amorphous precipitate.
3. Test paper, prepared by wetting filter paper with a mixture of ferric chloride and potassium ferricyanide, is turned blue *at once*.
4. When a drop of the hydrochloride solution of the alkaloid is placed in a dilute solution of potassium permanganate, very deep greenish-blue lines are seen to form throughout the permanganate solution. This blue color soon changes to a brownish yellow.
5. Ammonium hydrate gives a precipitate, soluble in excess of reagent.
6. Picric acid gives a yellow precipitate.
7. Gallic acid gives a slight white precipitate.

8. In concentrated solutions, mercuric chloride solution gives a slight white precipitate.

From the above reactions, and numerous others which gave negative results, it seems that a new alkaloid is present in the plant. To satisfactorily prove this, it is necessary to make an ultimate analysis of the alkaloid, determining what elements are present and in what proportions they exist. To do this it will require a considerable quantity of the drug, since, according to Dr. Lyons,* the alkaloid amounts to less than 0.1 per cent. of the drug.

By treating five (5) grams of the powdered drug with fifty (50) c.c. of strong ether, in a constant extraction apparatus, an ethereal solution was obtained, which yielded 1.716 grams of extractive matter. This was treated with cold potassium hydrate, which dissolved the greater part of it. The alkali solution was then poured into a large volume of acidulated water, which precipitated a considerable quantity of resin. This resin, when dry, was of a brown color, and soluble in absolute alcohol. The residue of drug, after extraction by ether, was acted upon by fifty (50) c.c. of absolute alcohol in an extraction apparatus. The alcoholic solution was poured into a large volume of acidulated water, which precipitated a very light yellow resin, about equal in amount to the resin obtained from ethereal solution. This resin, when treated with ether, yields a greenish solution, the color, probably, being due to the extraction of chlorophyll. This green solution, when poured into acidulated water, produces only a cloudiness, not a definite precipitate. These experiments seem to indicate the presence of *two* resins in the plant, both soluble in absolute alcohol, but the alcoholic resin almost, if not entirely insoluble in ether. The resin from the alcoholic solution is also lighter in color.

A tincture of the drug was made with absolute alcohol, the resin precipitated by pouring into acidulated water, and filtered. A small portion of the filtrate gave a blue fluorescence when rendered alkaline. To the filtrate was added subacetate of lead in excess, which precipitated a lemon yellow substance, partly soluble in acetic, entirely soluble in dilute nitric and hydrochloric acids.

The filtrate from the subacetate of lead precipitate was freed from the excess of lead by hydrogen sulphide, filtered, and this second filtrate concentrated. Now, to a small portion of it a few drops of sulphuric acid were added, and the mixture boiled for some time. Then it was neutralized with potassium hydrate, and again boiled with Fehling's solution, which resulted in the reduction of the latter. Hence it appears that there is a glucoside present in the plant.

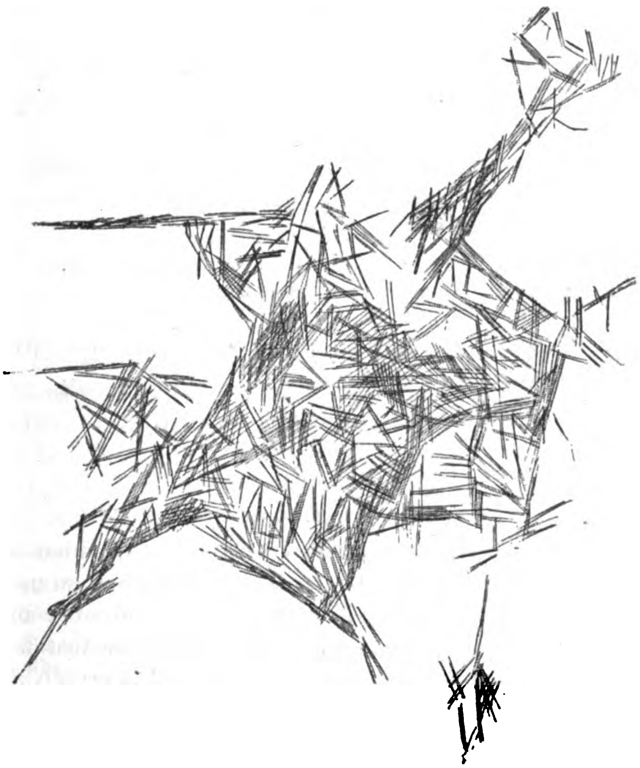
On adding an alcoholic solution of ammonia to an ethereal tincture of the drug, a bulky white amorphous precipitate was formed, soluble in ex-

* Dr. A. B. Lyons, Amer. Jl. Pharm., 58, 65.

cess of reagent. On standing, the precipitate became crystalline, the white acicular crystals (see figure 3) sometimes forming rosettes. These crystals are insoluble in water, acids and alkalies, readily soluble in ether, chloroform, an excess of strong alcohol and hot dilute alcohol, from which they again crystallize on standing. It is a substance rich in carbon, tasteless, and as Dr. Lyons says, probably inert.

By repeated trials it was found that ether extracts about 35 per cent. of the drug. This extract is a soft resin in appearance, and on being

FIGURE 3.



Crystalline Principle from Pichi.

subjected to a temperature of 100° C., loses about twenty-three (23) per cent. of its weight, due, probably, to the presence of a volatile oil and some moisture. Hot water dissolves about fifteen (15) per cent. of the ethereal extract, the solution being of a yellowish green color, with a bitter taste resembling the taste of the drug. The water solution, when rendered strongly alkaline, shows a blue fluorescence.*

* Dr. A. B. Lyons, 1886 Amer. Jl. Pharm., 58, 65.

This fluorescent principle I have not been able to obtain in a pure state, but the observations I have made upon it are that it is quite soluble in ether and chloroform, slightly soluble in cold water, more freely soluble in hot water. The blue fluorescence is brought out only in alkaline solutions and destroyed by acids.

By treating fifteen (15) grams of the finely powdered drug by dry distillation, gradually heating till the temperature had raised to 150° C., I obtained a small quantity of a volatile oil of rather a pinkish tinge. It was so small in quantity, however, that I was not able to ascertain many of its properties. By treating it with strong sulphuric acid it is changed to a dark brown solution. Fuming nitric acid gives a brownish red solution.

The following is a list of references covering the chemical examination made by Dr. Lyons, and various reports on the therapeutic properties of the drug.

Dr. A. B. Lyons, 1886: Amer. Jl. Pharm., 58, 65; Pharm. Rec., 6, 51; Proc. Amer. Pharm. Ass'n., 34, 394; Pharm. Jl. & Trans. [3], 16, 722; Year Book Pharm., 1886, p. 183.

Dr. A. Rodriguez, 1886: Pharm. Jl. Trans. [3], 16, 542; Amer. Jl. Pharm., 28, 90; Proc. Amer. Pharm. Ass'n., 34, 394.

Mr. Calvert read the following paper, which was accompanied by forty-four specimens:

THE NATURE OF THE PRECIPITATE FOUND IN TINCTURE OF BOLETUS LARICIS.

(*Answer to Query 8.*)

BY C. W. PHILLIPS.

Until the time arrives when we shall be better acquainted with this drug, and methods are devised for more successfully separating its constituents, it will be impossible to give a complete quantitative analysis of the precipitate found in the tincture, and it may be that that is beyond the scope of the query. Before this paper is closed, however, the query proper will be fully answered, directly or indirectly. Having only a small quantity of the precipitate on hand, and being unable to procure any more in the near future, I concluded to work with the drug proper, learn all I could about it, and report accordingly. I think I am safe in saying that the precipitate consists chiefly of agaric acid, mixed resins mechanically carried down with it, and that large quantities of the most valuable constituents of Boletus Laricis have heretofore been thrown away in the residue left after preparing Tincture Boletus by percolation with cold alcohol, as well as in the precipitate that has been filtered off. This is evident from the fact that it requires about 126 parts of 90 per cent. alcohol at 15° C. to dissolve one part of agaric acid, according to E. Jahns. Now, when we consider a tincture the strength of a fluid extract,

it is easy to see that most of the agaric acid would be left behind, while what little superfluous acid was dissolved under the temporary pressure would afterward crystallize out.

It would seem that a tincture prepared from 50 per cent. alcohol, according to the Homœopathic Pharmacopœia, would contain very little of anything, although purporting to be a strong mother tincture. It could not contain much agaric acid, as that is less soluble in 50 per cent. alcohol than it is in 90 per cent. alcohol, and the red resin is scarcely soluble in 50 per cent. alcohol, and what little does dissolve is precipitated on standing, as will be seen by the sample herewith presented. As to the alpha and gamma resin, I am not as yet prepared to say, and whether these resins have any medicinal virtues or not is still an open question. The process for the homœopathic tincture is a wasteful one, and I could not recommend it at all.

There still seem to be some doubts in the minds of manufacturers with regard to agaric acid, for they all seem to prefer to call it agaricin. Can it be some common acid combined with a resin, from which the acid cannot afterward be separated, as suggested by Watts with regard to many organic acids? I hardly think so. It appears to be a definite compound, with a definite crystalline form, according to the liquid from which it crystallizes, and also having peculiar and characteristic reactions.

As for benzoic acid, I have sought for it, but could not find it. Agaric acid produces a precipitate with ferric chloride, somewhat after the manner of benzoic acid; this may account for earlier chemists thinking they had found benzoic acid. In the course of my experiments I found a substance that looked as much like benzoic acid as anything I ever saw, but it was not, as it was known to be a soda salt, and in trying to eliminate the acid was all lost. I regret very much that I did not save a small sample to present to the Association.

More than one hundred different schemes have been tried for the separation of the constituents of Boletus Laricis, many of which proved to be complete failures, while others were more or less successful, but none as yet quite satisfactory. The more successful processes will be related, together with as complete a resume of recent literature as I have been enabled to obtain.

When one volume of Tincture Boletus, two volumes of water and two of benzol are shaken together, the mixture separates into three distinct parts: A lower watery solution, a honeycomb-like precipitate, and a benzol solution which rises to the top. In which place shall we look for the agaric acid? The two solutions, as well as the precipitate, have an acid reaction. The crystals from the benzol solution resemble agaric acid, but Jahns says it is almost insoluble in benzol. The benzol solution is considerably colored and that would seem to indicate that the red resin had been dissolved. The precipitate dissolved in alcohol and treated with alcoholic potassa gave only a slight precipitate.

If a solution of hydrate of soda is added to Tr. Boletus, a precipitate of agarate of soda separates immediately. If this is filtered off, and the filtrate allowed to stand for several days, a heavy oily substance separates and locates itself in a distinct layer at the bottom of the tube. This substance, which is of a dark amber color, appears to be a soda salt, which is liquid, or at least hydroscopic, at ordinary temperatures, and when exposed to 32° F. separates in crystals. This experiment led to the development of a scheme that will be discussed further on.

When Tr. Boletus is treated with alcoholic potassa, the same thing occurs. When the moderately pure agaricin in Schmieder's process is treated with alcoholic potassa, as directed, the agarate of potassa is immediately precipitated as an amorphous mass, but after two or three days an oily layer separates in a similar manner. One might think this was oil of tartar, or deliquesced carbonate of potassa. In the former instances it cannot be so, as we shall presently see. That this substance is a soda or potassa salt, I think there can be no doubt, but what acid is in combination remains a question. In purifying the moderately pure agaricin, there is a great loss. Schmieder accounts for it from the fact that the gamma resin does not form a salt, and, therefore, remains behind when the potassa precipitate is dissolved in water—the filtrate containing the alpha resin, forming a potassa salt soluble in alcohol, accounting for another loss. This seems to be correct, and I cannot agree with Jahns that Boletus contains from 16 to 18 per cent. of agaric acid. In fact, I do not believe that the yield will exceed 6 or 7 per cent. of purified agaric acid. In Jahns' process the alpha and gamma resins are supposed to be gotten rid of by repeated crystallizations, and I do not think the process altogether satisfactory.

When benzol is added to Tr. Boletus, no precipitate is produced, but after long standing crystals are deposited on the sides and bottom of the tube. If Tr. Boletus is treated with acetic acid and benzol, a precipitate is immediately produced, which redissolves in the benzol and floats on top. Agarico-resin is reported soluble in acetic acid, agaric acid as slightly soluble; then it would follow that the precipitate was agaric acid and that it has dissolved in the benzol and floats on top. Tr. Boletus was treated with water and the filtrate examined. It proved to be altogether indifferent to reagents, saving that it had a slight acid reaction.

The following method is suggested in Liebig's Chemistry, but I do not advise any one to try it. It would not be mentioned, only that it looks nice in print and one is tempted to try it: Boil the Boletus with water, precipitate with lead acetate, separate and wash the precipitate, suspend in water and pass sulphuretted hydrogen through the mixture, separate the precipitated sulphide of lead, and crystallize. The mechanical difficulties of this process are many.

When tincture of boletus and ether are mixed in equal proportions,

nothing seems to occur; but after long standing a number of arborescent crystals appear at the top of the tube, away from the liquid, showing that a portion has volatilized and crystallized.

Tincture Boletus was evaporated to dryness, the extract triturated with benzol and filtered, the residue treated with hot 60% alcohol and crystallized.

At that time the crystals were thought to be agaric acid, but now I am very much puzzled about it; the residue was a white substance partly soluble in chloroform. The benzol solution, which has a distinct acid reaction, deposits good-sized crystals on long standing. I am now inclined to think that these crystals are agaric acid. But what has become of the red resin?

An alcoholic solution of the precipitate found in tr. Boletus was treated with hydrate of soda and filtered, the precipitate dissolved in water and reprecipitated with alcohol. An oily substance is separated, thought to be agarate of soda. The first filtrate was neutralized with hydrochloric acid and ether added; after several days a crystalline precipitate made its appearance, which proved to be chloride of sodium. It was thus ascertained that hydrochloric acid was not a suitable acid to employ, owing to the perceptible solubility of sodium chloride in alcohol. Sulphuric acid was afterward used and the precipitated sulphate of soda filtered off at once. In the above case, however, the sodium chloride was filtered off and the ether-alcohol solution allowed to evaporate spontaneously. We now have the crystals obtained and the mother-liquor filtered from them. This, for the sake of clearness, I will designate as the second filtrate. The crystals were dissolved in hot alcohol, and recrystallized. The crystals were filtered off and the filtrate designated as the third filtrate. The snow-white crystals were boiled with water, were entirely soluble, neutral to test paper. Nitrate of silver produced a precipitate entirely soluble in ammonia.

Hence I would have concluded that I had more chloride of sodium, had it not been that a solution of lead acetate produced a precipitate, insoluble in boiling water. The third filtrate was then evaporated to dryness, and the residue found to be insoluble in water, but soluble in alcohol, with an acid reaction. Upon going back to the second filtrate, it was found by this time to contain a considerable precipitate; this was filtered off, and after having been washed with water and dissolved in alcohol, gave an acid reaction. Treated with nitrate of barium, it gave a copious precipitate. Unfortunately I found it impossible to come to any satisfactory conclusions from these experiments, and resolved to try another process, and devised a scheme for the purpose, based on the insolubility of the soda salt of agaric acid in alcohol. This scheme has not as yet been entirely developed, but some good results have been obtained, although some results are quite puzzling.

Boil 100 grams of agaric with 50 grams hydrate of soda and one litre of water, filter and wash the residue.

RESIDUE (*a*)		FILTRATE (*b*)	
Boil with HCl and filter.		Add alcohol	
RESIDUE (*c*)	FILTRATE (*d*)	PRECIPITATE (*e*)	FILTRATE (*g*)
Cellulose Yield 26.5 gms.	Not yet examined.	Dissolve in water and reprecipitate with alcohol. Yield 7.7 gms. of agarate soda (*f*).	

FILTRATE (*g*)

After some time an oily substance separates which crystallizes in the cold. Alcohol was then added in excess and cooled below freezing, when a large quantity of agarate of soda (?) (*h*) separates in needle-shaped crystals. The alcohol solution was decanted and the crystals washed with alcohol below 32° F. This mass of crystals looks and cuts like dates.

THE PRECIPITATE (*h*)	FILTRATE (*h′*)

Process 1. Redissolve in water and precipitate the aqueous solution with H_2SO_4. Dissolve the washed and dried precipitate of agaric acid (?) in alcohol and crystallize.

Yield 4 grams (*i*)

Yield 2.3 grams (*j*) second crop.

NOTE.—Agaric acid (?) prepared in this way is soluble in water, without becoming ropy.

Process 2. A part of the washed precipitate was not dried, but while yet soft mixed with ether, shaken with water and H_2SO_4 the ethereal solution decanted and crystallized.

Yield 3.2 grams agaric acid (?) (*k*)

Yield .4 grams agaric acid (?) second crop.

There was a small residue (*l*) not soluble in ether, supposed to be Na_2SO_4, but upon heating on platinum wire it melted, then took fire and burned. (Fumaric acid is said to behave similarly.) Upon dissolving some of the residue in water and testing with nitrate of barium, a white flocculent precipitate was produced, insoluble in excess of HNO_3.

FILTRATE (h').

After several weeks, silvery white crystals in plates (m) separated. These crystals looked like benzoic acid, but, of course, could not be, as it must have been a soda salt. These were filtered off and an attempt made to separate the acid.

THE CRYSTALS.

These were dissolved in water, dilute H_2SO_4 added. A precipitate was formed, but immediately redissolved. I then thought I would evaporate to dryness and extract with alcohol. Evaporation was conducted on a water bath, but when nearly dry decomposition took place, and nothing but a charred residue was left. It gave off a peculiar odor.

FILTRATE.

When I returned to this filtrate after several days, much to my surprise a considerable quantity of needle-shaped crystals (n) made their appearance. Some were as much as an inch in length and $\frac{1}{32}$ inch in thickness. No attempt was made to analyze these crystals; a sample is herewith submited. The filtrate was then treated with water and H_2SO_4.

PRECIPITATE (o).

The precipitated resin is washed and dried.

Yield 16.1 gms.

NOTE.—The red color seems to be drawn by capillary attraction to the outside edge of the filter paper.

FILTRATE (o')

The filtrate was distilled to recover alcohol, treated with more water, filtered, and the precipitated resin dried.

RESIN (p).

Yield 3.6 grams.

DISTILLATE (q).

This has an odor of Boletus, and deposits a scanty white sediment on standing.

FILTRATE (r).

This filtrate contains H_2SO_4 and other acids in Boletus, as soda salts. I have not succeeded in separating these acids.

If i, j and k are identical, the yield of agaric acid would be about 9.9 grams, plus 6.7 grams (the equivalent of 7.7 grams of agarate of soda), or 16.6 grams. This would be fairly in accord with Jahns' statement that Boletus Laricis contained from 16 to 18 per cent. of agaric acid. i and k do not seem to be identical with agaric acid, although I have chosen to call them agaric acid (?) for the present. The residue takes fire and burns without leaving a residue. This reaction is stated to be characteristic of agaric acid by Dr. Bernard Fischer. If this residue was agaric acid, I don't know why it would not dissolve in ether; however, the amount was very small, and it is probably unimportant.

The filtrate *r* has thus far baffled every attempt at separation, and from the small quantity of delta-resin obtained in this process it is probable that it has undergone decomposition and exists in some other form in this filtrate, or else the delta-resin obtained in Schmieder's process is a very complex body.

The following is a translation from Hager's Untersuchungen, Vol. II, page 323:

AGARIC

is the dried thallus of Polyporus officinalis, and as a medicine is scarcely used any more by physicians, but is employed in receipts for stomach bitters and life elixirs. The resinous constituent (the delta-resin is probably meant) acts as a drastic cathartic, yet milder than aloes, but no accident is recorded where a poisonous effect has been produced through its use. Agaric, as it is seen in the market, is a white, light, spongy mass, easily powdered by bruising and pounding, having a mushroom-like odor, and at first a sweet taste, but afterward an unpleasant acrid taste. By heating with strong alcohol or ether more than fifty per cent. is dissolved, about one-third of which is designated as agaric acid and two-thirds as agarico-resins.

The agaric acid crystallizes in small microscopic needles, slightly soluble in water, but giving it an acid reaction. It is easily soluble in alcohol, and by heating in alcohol is partially volatilized. It is difficultly soluble in ether, chloroform, benzol and bisulphide of carbon; insoluble in petroleum ether, soluble in caustic potash solution (aqueous, of course) and in hot carbonate of soda solution, from which it is precipitated in white flocks by acid. Its alkaline solution gives a precipitate with many metallic salts.

Agarico-resin is a red-brown mass, which rubs up to a pale yellow powder, is insoluble in water, easily soluble in alcohol and ether, and is also dissolved by chloroform, but not by bisulphide of carbon, benzol or petroleum ether, as it is by hot carbonate of soda solution.

The agarico-resin, or resinoid (in fact, I know of no word in the English language to express this idea exatly), the mixture of agaric acid and agarico-resin noticed in a former edition, is not very characteristic with regard to its solvents. Ether entirely dissolves it; chloroform, bisulphide of carbon and ammonia solution partly; hot carbonate of soda solutions only insignificantly; benzol dissolves it somewhat by heating, and petroleum ether not at all. The water that has been digested with an alcoholic extract of Boletus is almost colorless and indifferent to reagents.

The following is a translation from "Die neuern Arzneimittel, von Dr. Bernhard Fischer."

AGARICIN.

Agaric acid, $C_{16}H_{30}O_5H_2O$, is a definite principle from Boletus Laricis. The whole subject of the chemical analysis of agaric has been reviewed without changing the actual results obtained by more ancient observers. Hitherto were three substances regarded, namely, the agaric acid of Fleury, the agaricin of Schoenbroet, and an indifferent body, the agarico-resin. E. Jahn shows later that the agaric acid of Fleury and the agaricin of Schoenbroet are identical and isolated another body in the pure state. J. Schmieder, with this ground-work before him, more recently arrived at the following conclusions, and gives the constituents of agaric as follows: Soft resin or wax $C_{15}H_{20}O_4$, agaricol $C_{10}H_{16}O$, cholesterin $C_{26}H_{44}OH_2O$, cetyl alcohol $C_{16}H_{34}O$, various hydrocarbons and fatty acids, and four distinct resins, the alpha, beta, gamma and delta resins, a nitrogeneous substance, probably albumen, and cellulose. Out of the beta resin is separated in a pure state the substance which we here name agaricin.

Preparation.—The powdered agaric is extracted with alcohol until exhausted, the four resins going into solution; the alcoholic extract is concentrated so that by cooling the white resin is separated out, while the red resin remains in solution. The white resin contains the agaricin, which, by handling with warm 60 per cent. alcohol, is obtained in a moderately pure condition. To make it absolutely pure, it is dissolved in hot alcohol and the solution precipitated with an alcoholic solution of caustic potash. The alpha resin now forms a potassa salt, soluble in alcohol; the gamma resin does does not form any salt; the potash salt of the beta resin is, on the contrary, perfectly insoluble in absolute alcohol. After some time the solution is filtered, whereby the alpha-resin is retained in the filtrate, the residue is dissolved in water and again filtered, whereby the gamma-resin remains behind, and the filtrate is precipitated with a solution of chloride of barium. It now forms the insoluble barium salt, which is heated with 30 per cent. alcohol and precipitated in the boiling solution with dilute sulphuric acid. The filtrate, while yet hot, separates out of its composition well-defined crystals, which by recrystallization from 30 per cent. alcohol are obtained entirely pure.

Properties.—In the pure state agaricin is a white, shining, silky, crystalline powder, with a faint smell and taste. Under the microscope the crystals can be distinguished as four-sided plates. From hot chloroform it crystallizes in prisms which can easily be seen with the naked eye. The melting point lies at about 128 to 129° C. It is slightly soluble in water, to which it gives an acid reaction. By heating with water it swells up and dissolves to a slimy, foaming liquid, from which, by cooling, it again separates into crystals. It dissolves in about 130 parts of cold, and 10 parts of hot alcohol, still easier in hot acetic acid, little in ether, scarcely in chloroform; and caustic alkalies form with it a strongly foam-

ing liquid. The composition of the compound has been determined with sufficient accuracy to be $C_{16}H_{30}O_5+H_2O$. By drying at 80° C., also by desiccating over sulphuric acid, it parts with one molecule of water of crystallization. At a higher temperature than 80° C., it gives up besides intermolecular water. From a chemical standpoint, agaricin is an acid, wherefore, agreeably to the purpose, the name agaric acid has been placed alongside of it. It contains two carboxyl groups. It is also a bibasic acid. Its constitution is illustrated by the following formula:

$$C_{14}H_{27}(OH){<}\begin{matrix}COOH\\COOH\end{matrix}+H_2O$$

The potassium salt is the most important, which is characterized by its complete insolubility in absolute alcohol.

Test.— .1 agaricin is dissolved in 15 c.c.m. of absolute alcohol, a few drops of alcoholic potassa is added, which gives a white precipitate which is perfectly soluble in water. This serves for its identification and absence of other resins. .1 agaricin, heated on platinum foil, burns without leaving any residue.

Use.—Agaricin (if it happens to be free from other resins), is the bearer of the sweat-shrinking action of Boletus, without having the purgative action of the same. It is given in a dose of .005 to .01 ($\frac{1}{12}$ to $\frac{1}{6}$ of a grain), best in pills with Dover's powder to check the profuse sweats of the consumptive. Through the influence of certain medicines (antipyrin) it produces sweating. The full effect is first observed in five or six hours.

Subcutaneous injections are painful.

Agaricin is not to be confounded with agarythrine, an alkaloid prepared by Phipson, in 1881, from Agaricus ruber, which is intensely poisonous.

The following table has been arranged in order that this process may be more easily comprehended:

J. SCHMIEDER'S PROCESS.

Powdered agaric is exhausted with alcohol, concentrated, cooled and filtered.

PRECIPITATE.	FILTRATE.
Digest with warm 60 per cent. alcohol and filter. The filtrate, on cooling, deposits moderately pure *agaricin*. This is dissolved in hot alcohol and precipitated with an alcoholic solution of potassa, and after standing some time, filtered.	Contains the delta resin, red resin, the cathartic principle.

PRECIPITATE.

Dissolve in water and filter.

RESIDUE.

Gamma resin does not form any salt with potassa, and therefore remains on the filter.

FILTRATE.

This contains the beta-resin or agaricin or agaric acid. Add solution barium chloride, which precipitates the barium agarate. The barium agarate is heated with 30 per cent. alcohol and precipitated from the boiling liquid with dilute sulphuric acid and filtered hot. The filtrate deposits, on cooling, well-defined crystals of agaricin (agaric acid). These, on re-crystallization from 30 per cent. alcohol, are obtained entirely pure.

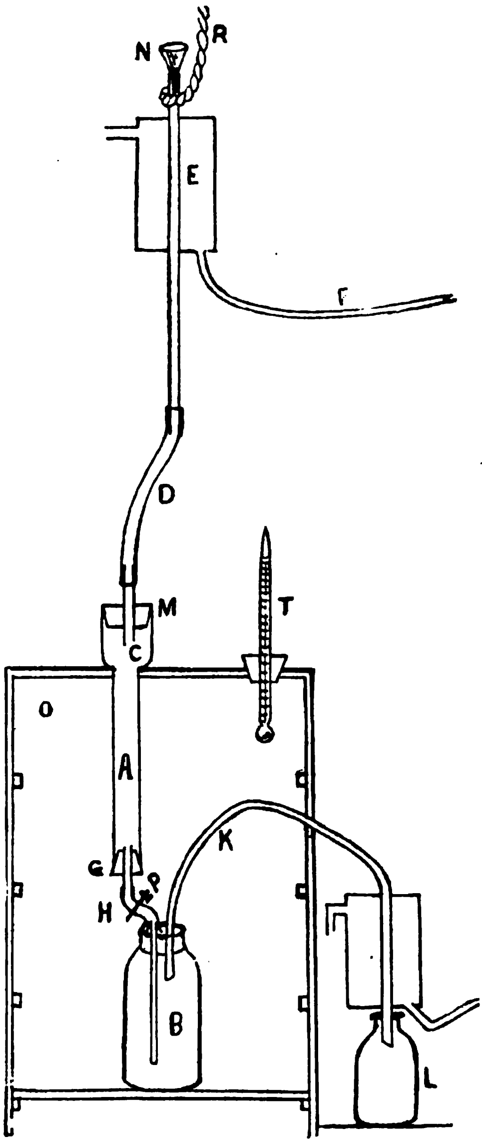
FILTRATE.

This contains the *alpha resin* which forms a potassa salt soluble in alcohol.

This process is an excellent one in many respects, and may possibly still be modified so as to make an ideal process. At first there were some mechanical difficulties. To exhaust agaric with alcohol, concentrate, etc., will do well enough where alcohol is cheap, but in this country it is necessary to take some extra precautions to save the menstruum, or the process will become too expensive. The agaric being like a sponge, seems willing to absorb almost any amount of alcohol. The next step, to digest with warm 60 per cent. alcohol and filter, presented another difficulty—the solubility of the agaricin being affected by a slight variation in temperature and the solution not being inclined to filter rapidly. The third difficulty arose when the agarate of potassium was precipitated by chloride of barium, and the agarate of barium thus produced had to be precipitated by dilute sulphuric acid in boiling 30 per cent. alcohol and filtered. These difficulties were finally overcome by means of a hot air apparatus and a continuous extraction apparatus that has been fully described in the *Pharmaceutical Record* by the writer, and also by means of another apparatus especially designed for the purpose.

I just happened to have 316 grams of agaric left, and the whole amount was put in the continuous extractor and exhausted with 94 per cent. alcohol, at a boiling heat, for two days. The thoroughness with which

this was accomplished will be seen by the sample of residuary matter herewith presented. This matter, after having been expressed and dried, weighed 111 grams, showing that 205 grams had been extracted by the alcohol.



It will be seen by this that nearly 65 per cent. of Boletus Laricis is soluble in boiling alcohol. On cooling, the moderately pure agaricin crystallized out. The moist agaricin weighed 111 grams, but lost more

than half its weight on drying. This was dissolved in hot 60 per cent. alcohol by means of the following apparatus, and filtered hot.

An ordinary student-lamp chimney *A* is placed through one of the top holes in the hot air oven *O* in such a manner as to be supported by the larger end, and a thermometer *T* is placed in one of the other holes. The shelves are removed, all but the lower wooden shelf, on which the wide-mouthed bottle *B* rests. (A one-ounce morphine bottle answers nicely.) The percolator *A* is connected by means of a perforated rubber cork with the tube *C*, which has been filed off at an angle to facilitate the dropping of the condensed liquid. The tube *C* is connected with the condenser *E* by means of the rubber tube *D*. The condenser *E* is supported by the rope *R* suspended from a hook in the ceiling. Cold water from the hydrant enters through the tube *F*. The lower part of the percolator *A* is provided with a perforated rubber cork *G*, the small end of which is covered with a small circular piece of filter paper, and this with a piece of muslin. The cork is then strongly pressed into the tube so as to hold the filter paper firmly in its place and not to leak. In the rubber cork is a small glass tube; this is connected by the rubber tube to a glass tube, going pretty well down in the bottle *B*.

The tube *K* is connected with the bottle *B* and conducted outside the oven through a condenser. Any alcoholic vapors arising from *B*; are partly condensed in the tube *K* and run back into the bottle *B*, the portion that passes over is condensed and collected in *L*. The rubber tube *H* is provided with a screw pinchcock *P*, which is closed.

The rubber cork *M* is removed and the crude agaricin is packed in *A* nearly up to the enlargement of the tube, and sufficient 60 per cent., alcohol poured over it to cover it. The cork is then replaced and the apparatus is ready for work. When the thermometer *T* registers 190° to 195° F., the liquid in the percolator *A* begins to boil; this boiling is allowed to proceed until the agaricin is pretty well dissolved; the pinchcock *P* is then regulated so the filtered liquid will drop gradually into the bottle *B*. If this amount of alcohol is not sufficient to exhaust the agaricin, a fresh supply is introduced into the percolator by means of the funnel *N* without taking down the apparatus or disturbing the heat. Any vapors that arise from the percolator are condensed by the condenser *E* and flow back into the percolator. By means of this apparatus the extraction and filtration are both accomplished at a boiling heat without loss of menstruum. When the percolator is empty (and this can easily be seen, as the front and back of the oven are of glass) the oven is allowed to cool, when the partly purified agaricin crystallizes from the liquid in the bottle *B*. When it comes to the second purification, and 30 per cent., alcohol has to be used, a higher heat is required, and not until the thermometer registers 220° F., is the liquid in the percolator kept boiling.

The first crop of crystals was quite pure, and when dry weighed 11.05 grams; the second crop was not so pure, and weighed 11.95; the third crop weighed 13.72: the fourth crop 5.00; the residue looked almost like red resin and weighed 4.06, making in all 45.72 of dry, moderately pure agaricin, or about 14½ per cent. of the agaric employed.

Ten grams of the first crystallization, which was the purest, was taken for further purification and dissolved in hot 94 per cent. alcohol and precipitated with alcoholic potassa, when the agarate of potassium was precipitated as an amorphous mass. The liquid was decanted and the mass washed with alcohol. The liquid and washings containing the alpha resin was set aside, while the agarate of potassium was dissolved in water and filtered. Only .02 of a gray substance remained on the filter. This I took to be the gamma resin. The filtrate was precipitated with barium chloride and the agarate of barium washed with water, mixed with 30 per cent. alcohol and introduced into the above described apparatus and heated to boiling. Dilute sulphuric acid was then added in sufficient quantity to precipitate the barium, and the heat continued until the barium sulphate began to settle; the pinchcock was then opened and the solution of agaric acid allowed to filter into the bottle below, the heat being maintained until the operation was complete. The oven was allowed to cool slowly, and beautiful crystals, visible to the naked eye, were obtained. The yield was 4.5 grams. The filtrate containing the potassium salt of the alpha resin was neutralized with acetic acid, and the precipitated resin washed and dried. It weighed 5.8 grams. This added to 4.5 grams agaric acid makes 10.3 grams, which is .3 grams more than was taken. This apparent discrepancy may possibly be accounted for from the fact that it is almost impossible to get the resin dried. But be that as it may, taking the 4.5 grams of agaric acid obtained as a basis of calculations, it is only fair to assume that Boletus Laricis does not contain more than 6 or 7 per cent., of pure agaric acid, while it contains a little more than that amount of the alpha resin.

The original alcoholic extract that was filtered off from the crude agaricin was found to contain a precipitate; this was filtered off, but only weighed .12 grams. The alcohol was then recovered by distillation. Toward the last of the operation the distillate began to drop more like oil than alcohol, and the distillation was stopped.

The residue which contains the delta resin or red resin, the supposed cathartic principle, was found very difficult to dry; in fact, it seems to be a soft resin at ordinary temperatures. This soft resin weighed 148 grams, representing 46.8 per cent., of the drug employed. This resin probably contains some of the agaric acid, but as agaric acid is only soluble in 130 parts of alcohol at the ordinary temperature, according to Jahn and Fischer, it is not likely that a litre of alcohol would contain over 8 grams, and this would not affect the percentage of agaric acid in

the drug more than two or three per cent., while the calculation based on the impure agaricin, which, of course, contains some of the red resin, would offset it the other way. Estimating the constituents of agaric on this basis, 316 grams would contain:

Alpha resin	26.51,	representing	8.07%
Agaric acid	20.58,	"	6.51%
Gamma resin	1.14.	"	.36%
Delta resin	148.00,	"	46.80%
A white substance	.68,	"	.21%
Insoluble in hot alcohol, mostly cellulose.	111.00,	"	35.12%
	307.91,	"	97.07%

Here is a loss of three per cent., if not more, and it is hard to tell where it is gone, unless it is lost in purifying the beta-resin, or is to be looked for in the alcohol that was distilled from the red resin. That something has distilled over with the alcohol there can be no doubt, but what it is is quite another question. The alcohol has a distinct odor of Boletus, and deposits a sort of resinous substance around the cork, although the alcohol itself is perfectly colorless. The odor may, perhaps, be better described by saying that it smells like dried slippery elm bark. A five per cent solution of agarate of soda, obtained in the soda process at the point *F* when no other chemicals had been used save alcohol, was taken and the following reactions noted. The reactions, I think, are entirely due to agaric acid. With sulphuric acid and ether the agaric acid precipitates, dissolves in the ether and floats on top of the aqueous liquid, and finally separates from the ether solution in crystals.

Ferrocyanide of potassium produces no reaction.

Bichromate of potassium becomes lighter in color and a very slight crystalline precipitate separates.

Sulphate of copper produces a greenish precipitate, insoluble in excess of sulphuric acid.

Acetate of lead produces a brownish white precipitate.

Nitrate of silver produces a curdy precipitate, soluble in ammonia. The silver salt is not reduced.

Calcium chloride gives a precipitate not entirely soluble in hydrochloric acid.

Strontia nitrate produces a precipitate insoluble in nitric acid. The precipitate finally locates itself on top of the liquid.

Mercuric chloride produces a precipitate at first yellowish orange, and finally changing to red.

Mercurous nitrate produces a brownish white precipitate.

Cobalt nitrate a dirty white precipitate.

Ferric chloride produces a precipitate insoluble in hydrochloric acid.

Baric chloride produces a gelatinous precipitate insoluble in hydrochloric acid.

The following are believed to be correct:

	AGARIC ACID.	AGARIC RESIN.
Alcohol	soluble freely when hot	easily soluble
Ether	slightly	easily soluble
Chloroform	slightly	soluble.
Benzol	soluble (with difficulty, Hager)	insoluble (Hager).
Water	soluble when pure	insoluble.
Acetic acid	slightly, easily in hot	soluble
Alkaline solutions	soluble	soluble.
Oil turpentine	soluble	insoluble (?).
Bisulphide carbon	difficultly soluble (Hager)	insoluble (Hager).
50% alcohol	soluble	insoluble.
Wood alcohol	soluble, precipitates on standing	soluble.
Glacial acetic acid	soluble	?.
Petroleum ether	insoluble	insoluble.

Now with regard to Tincture of Boletus Laricis, it is suggested that if the cathartic effect of boletus is desired, that simply a tincture of the red resin be prepared, as this will keep indefinitely, I think, without precipitating. If the anti-diaphoretic effect be desired, it is suggested that the pure agaric acid be used, or a saturated alcoholic solution of the pure acid, ten to twenty minims of which would contain a full dose. It is possible, also, that the agarate of soda would be a valuable salt. *Merck's Bulletin* for January, 1889, and the *American Journal of Pharmacy* for May, 1889, have articles on the therapeutic action of agaric acid.

The following specimens are herewith presented:

1. Tr. Boletus Laricis.
2. Precipitate found in Tr. Boletus Laricis.
3. Tr. Boletus, with strong alcohol, 1 part drug to make 4 of tincture, showing that this does not prevent precipitation.
4. Homœopathic Tincture of Boletus Laricis.
5. Alcoholic solution of the precipitatet hat has been filtered, but re-precipitates on standing. See Proceedings of 1883.
6. Alcoholic solution of red resin.
7. Ether solution of residue from 5. See Proceedings 1883.
8. Residue from 7, insoluble in alcohol, ether and water. See Proceedings of 1883.
9. Residuary cellulose, soda process.
10. Agarate of soda, soda process *f*.
11. Agaric acid (?), soda process *i*.
12. Agaric acid (?), soda process *k*.
13. Agarico-resin (?), soda process *o*.
14. Agarico-resin (?), soda process, found in still *p*.
15. Alcoholic distillate, soda process *q*, showing precipitate on standing.
16. Needle-shaped crystals, soda process *n*.

17. Resin collected from side of extraction apparatus, Schmieder's process.

18. Resin collected from lower part of percolator in extraction apparatus.

19. Residue from extraction with hot alcohol.

20. Gamma resin.

21. Supposed to be gamma-resin found at a different part of the process.

22. Alpha-resin.

23. A white substance.

24. Moderately pure agaricin, Schmieder's process—the first crop of crystals from 60 per cent alcohol.

25. Second crop of crystals.

26. Third crop.

27. Fourth crop.

28. Delta-resin or red resin.

29. Alcohol recovered while purifying agaric acid, showing the agaric acid that has distilled over and precipitated.

30. Purified agaric acid obtained on the first crystallization from 30 per cent. alcohol after having been precipitated by barium chloride and decomposed with dilute sulphuric acid.

31. Tr. Boletus one part, water two parts, benzol two parts.

32. Alcoholic solution of the precipitate in 31.

33. Benzol solution from 31 evaporated to dryness, showing crystals dispersed though a varnish-like mass.

34. The alcoholic solution, 32, treated with alcoholic potassa, becomes blackened and develops the odor of red raspberries.

35. The last run of alcohol from the delta-resin, having the peculiar odor of slippery elm bark.

36. Solution of precipitate found in Tr. Boletus treated with hydrochloric acid and benzol.

37. Solution of precipitate found in Tr. Boletus, treated with hydrate of soda, the precipitate filtered off and the filtrate allowed to stand, showing the heavy, oil-like liquid which separates. I had at one time about a pint of this substance, which I prepared from the drug.

38. Tr. Boletus evaporated to dryness and extracted with benzol. The benzol solution deposits crystals on standing.

39. Tr. Boletus and chloroform; very small crystals separate after a long time.

40. Tr. Boletus and benzol; quite a precipitate occurs on standing.

41. Tr. Boletus precipitated with soda solution, the filtrate neutralized with acetic acid, and ether added, after some time a white cotton-like precipitate.

42. Some of the soda solution treated with acetic acid and benzol. The liquid separates into three parts.

43. Some of the soda solution treated with hydrochloric acid and benzol. Separates into three parts as before.

44. Some of the clear benzol solution decanted from 43 and allowed to stand, showing the precipitate that occurs.

Three papers on Preparations for the Skin, Poisonous Plants of California, and Pines of California, were read by title and referred for publication.

PHARMACY AS APPLIED TO PREPARATIONS FOR THE SKIN.

BY FRED. B. KILMER.

The subject chosen is one of interest to many of us, and one that has not received much attention.

It would seem to be both a satisfactory and fruitful field for investigation, as in our calling we are prone to deal in things that are tangible. When we can see, measure and weigh, we feel that we have some hope that no unfathomable problem will arise and prevent a complete mastery of the situation.

In the preparation of medicines for internal administration, chemical theory and pharmaceutical practice are often thwarted by some unknown condition in the human system. Drugs are rendered useless from incompatibilities that are beyond our research. But in the application of remedies to diseases that admit of external treatment, chemical analysis, the eye, the microscope, will enable us both to see the contending forces and the effect of medication. Every quarter, every decade of the century just closing, has marked progress in the advancement of science, and with this advance has been progression in that branch which we represent. The annual compilation of the "Progress of Pharmacy," which is a great credit to this body and its honored author, shows the long strides that take place as the years are numbered. A retrospect by those of us not yet aged will reveal the fact that we are a "long way ahead" of the almost empirical practices that were the best we knew when we entered the profession. Yet in the line of the subject chosen, the writer holds that we have not kept pace with the onward march of improvement.

The cerates, ointments and plasters are virtually the same as those recorded in the history of medicine from the earliest ages.

They enveloped medicinal agents in fats, using spices and gums to preserve them, for an ointment; spread gums upon cloth or leather for a plaster. We still follow their methods. Indeed, if we examine some of the relics of the ancient art of an apothecary, it would puzzle us to imitate them.

In this line our Pharmacopœia has practically added nothing new in

its several revisions. In the classes known as unguenta and cerata, the required drug is simply suspended in a fatty base. In emplastra we are confined by the Pharmacopœia almost exclusively to the lead plaster base, sometimes combined with resinous substances, or with fats and wax. In this class we find that the use of the pharmacopœial plasters is so limited that, as a commentator (U. S. Dispensatory) expresses it, "The spreading of plasters has become, to a great extent, a lost art to the pharmacist of this country."

Plasters made with the lead plaster base or resin plaster base, have been found to have such disadvantages that the rubber combination plasters have for the last twenty-five years or more taken their place. Rubber plasters are factory made, and their chief advantage is their convenience, and the thanks of pharmacists generally are due the manufacturer for the way we have been relieved of the tedious back-aching operations we formerly experienced in spreading plasters. Rubber plaster masses have but few advantages. In some instances they probably envelop and protect the drug from atmospheric change, but with others they rapidly decompose.

They form an impervious covering to the skin (sometimes desirable and sometimes not), but they hold the drugs combined in so complete an envelopment that action is uncertain, and a great amount of medicinal agent is necessary to produce a small result. Physicians have often reported to the writer that the best made rubber plasters gave no result that would indicate the amount of drug they contain was present. Other than these we have the glycerita, the oleata and the linimenta.

The glycerites present many attractive features by their stable character, absence of odor, slight antiseptic powers, and a fair range of solubility; but glycerin as a means of conveying medicinal agents to or through the skin has proven a failure. It is almost perfectly non-absorbable. Such drugs as atropia, veratria, etc., when applied in solution in it are almost wholly inert. It has been found to produce irritation, and is not used by most dermatologists.

The preparations glycerita, and especially glycerite of starch, from which much was hoped, as it promised to give a non fatty base permanent in character, cleanly, and adapted to a variety of uses not within reach of our other preparations for the purpose, are compatible with only a limited number of drugs, feebly absorbable, and have not proven of great service. (In works on skin diseases it is scarcely mentioned.) Of the liniments we find that those with a saponaceous base, or containing caustic properties, as in linimentum ammoniæ, find the most extended use. But few drugs are capable of application in this form, and but ten are officinal, and half of these little used. We have not much changed this class, and by the many suggested improvements and changes found in our journals, it is evident that they are not perfectly adapted for their intended use.

The greatest advance we have made in the line under discussion has been in the introduction of the limited number of compounds known as oleates. (But two are officinal.) For these we are indirectly indebted to the researches of Chevreul, who, as early as 1811, separated fatty acids from their bases, and to the later work of Dr. John Marshall, Prof. Attfield, Dr. Wolff, Dr. Shoemaker, H. B. Parsons and others, who introduced them to the medical profession since about 1862. The oleates have found a moderate place in our Materia Medica; a few drugs form stable compounds with them. We probably have not reached the limit of our knowledge of them, and may yet be able to give them a more substantial footing. They are free from objections, as they possess irritating properties producing pustulations and eruptions, and rapidly oxidize on exposure to the air.

The classes of fatty applications in our Pharmacopœia which have a very extended use, are ointments and cerates. In these we simply mix the drug, or suspend it in the fat, adding wax, etc, to give it consistency. Under the most careful manipulation they are but a mechanical suspension. No attempt is made to dissolve the drug. The drugs themselves are not absorbable if applied directly to the skin, and if suspended in a non-absorbable fat they become no more than a coating to the affected part, and our medical friends practically find them either caked upon the surface, or in case of soft ointments, running over the adjoining parts, soiling the clothing, and are by no means up to the standard of the preparations of modern pharmacy. Dr. Unna, who is one of our well-known writers upon dermatology, shows that animal, vegetable, and mineral fats have no other effect upon the skin or body than to hinder the watery vapor and fluid sweat, and so retain bodily warmth. They are like clothing. The ancients who wore scanty clothing anointed themselves as part of their toilet. Inhabitants of extreme cold countries do so now with no preceptible change in their systems as a result. Lard is undoubtedly the best base for such preparations. When an oil like olive or almond oil is used, it passes through the skin slowly and very uncertainly. Lard is absorbable to a certain degree. Dr. Guttmann (in *Med. Chron.*, *Amer. Jour Pharm.* 1887, 492) has shown that lard is superior to lanolin in promoting absorption of drugs. No less authority than Prof. Remington (Proceedings A. P. A., 1883) states that vaseline is equal, if not superior, as an ointment base to lard. In the matter of producing a more elegant looking preparation it may be true, but upon such eminent therapeutic authority as Dr. Robinson of England, Dr. Hermann Hager, Dr. Meilick of Hamburg, Auspitz of Vienna, Keenan and Shoemaker of this country, and others, we find petroleum fats are among the least desirable substances for such use, possessing decidedly objectionable features. They contain stimulant constituents that will produce irritation, and according to Meilick (Monatsschrift für practische Dermatologie) the skin

is partially if not entirely impervious to vaseline. Auspitz (Ziemssen's Hand-book of Skin Diseases) states that its office is purely that of a covering; it has no conserving or nutritive action on the tissue. Ointments with veratria, codeia, atropia, etc., have been reported almost entirely inert, made with vaseline. Experiments made by the writer with cantharides showed that when lard was used in the place of vaseline, the same lot of drug would vesicate in one-half the time. If a thin coating of vaseline, lard, oleic acid or oleite be applied to an unbroken surface, it will be demonstrated that the two latter are readily absorbed, oleite the most rapidly, lard slowly, and vaseline will remain apparently the same for hours. What vaseline seems to do is, by its partial solvent power over some drugs, to present them in a finely divided state so that they are finally deposited upon the skin. But dusting or brushing on the drug would accomplish the same purpose in a much shorter time. Cotton-seed oil lard is very feebly absorbable, and will hardly answer for these preparations. Butter is not as absorbable as lard. Oleomargarine seems nearly equal to lard. (A curious instance occurred in an experiment with a particular lot of oleomargarine. All ointments made with it turned very dark in about twenty-four hours. It was imagined that it contained sulphur, but none was found, and for lack of time, further search for the cause was abandoned.) A customer of the writer's, who has occasion to use large quantities of blister for veterinary purposes, states that he can often vesicate with rancid butter or lard alone.

The factory-made plasters are no better adapted to the purpose of external medication than our pharmacy-made, or our ointments. One manufacturer gracefully acknowledges in his catalogue that "the attention of manufacturers of medicated plasters has hitherto been directed chiefly to perfecting the mechanical excellence of their preparations, overlooking the real aim and end for which a plaster is made, *viz.*, the capacity of such a preparation to promote absorption of the incorporated drug." Plasters made by a prominent manufacturer were examined by the writer, and he was permitted to see them made and satisfy himself that the proper amount of drugs of good quality was used. One specially made for dermal use contained 30 per cent. extract of belladonna. The extract yielded 2.5 per cent. of atropia, and a piece of plaster (rubber base) 6 inches square contained 29 grains solid extract of belladonna, equal to .87 grains of atropia, and should produce, if absorbed, toxic symptoms almost immediately, but as a fact they do not. Poisoning by belladonna plasters is very rare. The same manufacturer prepares plasters containing

Chrysarobin	35%
Iodoform	40%
Opium	20%
Red oxide of mercury	50%
Zinc oxide	40%
Sulphur	20%

These contain about 16 grains of mass to the square inch, and if the drugs were in a condition for ready absorption, highly active, if not dangerous, results would follow their use. As it is, a large amount of good drugs is apparently wasted.

It is probable that in these preparations we have not properly noted the forces with which our drugs are brought in contact in both health and disease. This requires not only a consideration of drugs, but anatomy, physiology and therapeutics as well. The writer holds that these are essential qualifications of the pharmacist, that to be a handmaid of the physician is not simply to be his serving maid, and dispense whatever drug he may call for, but that it lies within his province to direct the form and manner in which the drug shall be most specific and active. It would be out of place to attempt, in such a paper, to treat upon such subjects, but it seems necessary to briefly allude to some of the absorptive powers of the skin as defined in authoritative works on dermatology. The horny or outer layer of unbroken skin presents the greatest obstacle. It forms an unbroken layer, interrupted only at the mouths of the follicles and sweat glands, which are very minute. Below this horny layer we find a supply of lymph vessels and juice spaces that greatly favor absorption when reached. Any portion of the body not frequently washed, examined under an ordinary magnifying glass, will be found coated with watery and fatty exudations, dead epithelium, dirt and fibrous matters from the clothing. All these obstructions must be removed before we reach the scarf skin. According to Ziemssen, water is not absorbed when applied to the uninjured skin. Brause declares that salts, (even of iodine), in baths, gave negative results. Nor yet is absorption promoted by alcoholic solutions when simply brushed on the skin, although it is promoted by spraying solutions. Gases and volatile substances promote absorption, and in all cases absorption is promoted by the cleansing with alkaline or soap solutions. While slight absorption may take place with a drug under an impervious cloth back, or when suspended in a fat or oil, Dr. Unna holds that indifferent salts when applied to the skin as constituents of ointments, pass through it in quantities so very small as not to be noticeable, and only those which attack the horny layer are absorbed. The soaps, as in the German green soaps, as well as the addition of alkalies to the bath, soften the epidermis and diminish congestion in diseases. But the range of substances compatible with soaps makes their medication practically useless. Glycerin in soaps medicated is pro-

nounced useless, as it produces a smeary mass, and Auspitz declared that unless the drug is absorbable it is useless to combine it with soap. Ordinary fats need both vigorous pressing and rubbing, as well as prolonged contact for perceptible results, and in some instances friction with a brush is necessary. The writer found by experiment that carbonic acid, water and aqua ammoniæ holding salts in solution or suspension, would favor absorption, also that an electric current applied to the skin, especially in the case of iodine, would cause it to disappear beneath.

In disease still greater obstacles are met, and conditions to be encountered multiply. Inflammations, swellings, blisters, pustules are formed, discharges made, patches, crusts, scales and deposits in endless variety. Agents of putrefaction and change are at work that ward off our remedial agents, no matter how skillfully prepared or how well selected our drugs. Dr. Unna shows that in these cases it is not sufficient to bring the proper drug in contact with the surface, but that in most affeetions there are conditions where an intense penetration is important. In other cases where even the horny layer is removed, absorption is opposed by the outward flow of tissue juice which permeates the thinned and swollen scarf skin. It is evident from these remarks that our preparations do not fulfil what is required of them; that we do not keep pace with the progress of medical science in the treatment of this class of diseases; that treatment fails, not because the physician has not chosen the proper remedy, but because of the manner we dispensed it; that failure was due not to poor drugs, but to poor dispensing. In this line the writer holds that our pharmacy is centuries behind the practice of dermatology, and it has been his purpose in preparing to secure attention, if possible, to a neglected branch.

The writer can add but little in the way of improvement, or a solution of the problems involved as to the best manner of preparing drugs for this method of application, but will simply call attention to one substance that, while it seems to fulfill some of the requirements, may or may not be useful as a base or vehicle in which to administer drugs in skin medication. It seems at least to be entitled to research. While pursuing the subject which forms the basis of this paper, the writer's attention was called by Mr. R. W. Johnson (of Johnson & Johnson), to the substance known as Oleite.

The substance named Oleite is chemically a sulpho-ricinoleate of soda. It is prepared from castor oil by treating with sulphuric acid at a low temperature, when a compound of sulphuric and ricinoleic acids is formed. The free sulphuric acid being removed by washing, and any unchanged oil by ether, the resulting sulpho-ricinoleic acid is then neutralized by sodium hydrate, the finished product being a transparent, jelly-like liquid, with a little odor, acrid taste, soluble in water, alcohol, chloroform and essential oils. (For a more extended description of such

substances, reference may be had to the U. S. Dispensatory, 16th edition, page 1025, and a paper by Dr. A. Mueller Jacobs, in *American Druggist*, Feb., 1884.)

Substances similar in composition, known as "polysolve" and "solvine," are now upon the market, and a compound known as "Turkey red oil" (Türkisch-Rothœl) is in use as a mordant; but their resemblance, as far as utility for the purpose under consideration, is only in appearance, as far as the writer's experience goes.

Turkey-red oil contains a large amount of unchanged oil, water, and sometimes free acid. It has little or no action as a solvent for drugs.

Specimens of "solvine" or "polysolve" examined by the writer likewise contain unchanged oil, water, and were not neutral—some specimens being highly acid, others alkaline, and upon many drugs acted energetically and destructively. They had a decided odor of castor oil and a highly acrid taste, and a purging, cathartic action on the system.

Dr. Jacobs, in his article heretofore referred to, shows that the salts or compounds formed with sulpho-ricinoleic acid are of two series: the salts of the alkalies, and the acid salts of alkaline earths, being water soluble, while those of the neutral metallic salts appear in the form of amorphous, lake-like precipitates, insoluble in water.

The behavior of oleite towards drugs seems remarkable. When first experimenting with it, the writer was reminded of the dream of the alchemist in search of a solvent which would dissolve all substances. It is a solvent for at least a small percentage of almost any drug that it might be conceived would ever be wanted to be used with it. When the limit of its solvent power is reached, a very large amount is emulsified so as to be readily miscible with proper vehicles for use.

Oleite, being an already neutralized, water soluble substance will, to a varying decree, form water soluble compounds with drugs; but in compounds with an excess of heavy metallic salts, it suspends them in an amorphous form which I have termed emulsions, and produces different results than a simple union of sulpho-ricinoleic acid or oleic acid with a base.

The behavior of oleite towards drugs is so varied with each substance, that the writer is not able to state at present what changes take place chemically. With some drugs it seems merely a solution, with others, as heretofore remarked, a union of the sulpho-ricinoleic acid and base is formed.

Its action with mineral and alkaline salts has been already spoken of; with iron, lead, zinc and mercury, percentages varying from two or ten are completely soluble. Nearly all of the alkalies are dissolved in quite large proportions. Gums and resins are somewhat soluble, and, to a limited extent, made water soluble. Solid extracts form clear solutions, miscible with diluents. Iodoform and iodine are completely dissolved.

Owing, doubtless, to the neutralizing base used, iodine loses much of its color, and its solution in oleite does not stain as much as an alcoholic solution. Iodine stains upon the hands, clothing and utensils are readily removed by oleite. The same is true, in a less degree, with stains of chrysarobin.

(Dr. Jacobs says that the discoloration of iodine and bromine by such a compound is due to the action of sulphuric acid, whereby two atoms of the halogens are absorbed by one molecule of the acid, that is, (he says) simple addition takes place, with the formation, of bromide and iodide substitution products of the fatty acid series.)

Oleite seems to differ from oleic acid, from the fact that the base, castor oil, contains no oleic acid, and castor oil yields no palmitic acid upon saponification, and by the process of manufacture no stearic or palmitic acids should be present. Oxidation does not seem to take place in oleite as in oleic acid. Oleite is water soluble, while oleic acid is not. This gives it some advantages, as its compounds may be removed by cold water.

The experiments with this substance have not been exhaustive, and in but few cases has the percentage of solubility, or the chemical changes, been noted with sufficient accuracy to warrant definite statements, and its therapeutic application will only be spoken of.

The wide range of substances which may be dissolved or be brought into a condition to more readily penetrate the skin, certainly would claim for it a useful place in our materia medica. For if epidermic or dermic medication is of any use, it is reasonable that the more soluble the drug, the more energetic will be its action. Therefore a much larger class of drugs can be applied in this way than has heretofore been posssible.

Clear oleite applied to the skin in a very thin layer, while for a few seconds sticky, rapidly passes through the skin, leaving the skin dry, giving one the impression, if not closely watching, that it has evaporated.

The action of oleite is largely due to its affinity for liquids, whereby the layer of air upon the surface of the skin is displaced, and a close contact established between the oleite and the glands and follicles, and absorption rapidly follows; also to the slight saponifying action of the oleite, whereby the fatty exudation of the skin (dirt and other matters) are emulsified, and their power to prevent absorption removed. (See Knapp's Lehrbuch der Chem. Technologie, in action of saponifying agents upon the skin and fabrics.)

There is, doubtless, also a combined chemical and mechanical action between acids, fatty compounds, the liquids of glands, and follicles, whereby their strong affinity causes them to rush together, so to speak. In experiments with sulpho-oleic acid, the writer has, under certain conditions, secured absorption so rapid that it was painful.

When alkaloids or solid extracts containing alkaloids are made into a solution with oleite, their action is greatly heightened, so much so that in experience it has been necessary in making preparations containing aconitia, atropia, veratria, etc., to greatly reduce the strength. The same is true of iodoform and iodine. A very large amount of either of these can be employed in the ordinary way with a moderate effect, but with solutions in oleite, iodoform produces poisoning symptoms, and iodine eruptions, with what would be considered very weak solutions. Solutions in oleite of the metallic salts in large amounts are sticky, yet when applied to the surface and allowed to remain, are all absorbed within a prescribed limit. A noticible feature of solutions in oleite is, that they do not spread or run over adjoining surfaces.

Whether the use of oleite as a means of epidermic medication, will ever come into extended use the writer is not able to judge. In experiments made by physicians in connection with the writer, they have demonstrated that drugs dissolved in oleite act very energetically, that the amount required to produce certain effects is nearly the same as if administered hypodermically. In these experiments solutions of extract of belladonna produced characteristic action in very small amounts. Constitutional effects of mercury have been reported to the writer from the use of solutions in oleite. Very marked action was obtained from alkaloids. These experiments were not sufficiently accurate to detail here, and are only mentioned in a general way.

The statements as to the action of the ricinoleites upon tissue and blood corpuscles that have appeared from time to time, were probably based upon the preparations "solvine" and "polysolve." Oleite has no such action. Careful experiments made by the writer, aided by physicians, show that the contrary is true. Upon cuts, burns, open wounds, aggravated skin troubles, highly inflamed surfaces, its effects are soothing, mild and healing. It has been freely absorbed into the system, and taken internally without the slightest irritation. The only disadvantage that is known to the writer which would prevent its being applied as a solvent for drugs to be exhibited for epidermic medication is that preparations made with oleite and a drug simply are very sticky, and in the case of metals with drying properties, mercury, zinc, lead, etc., unless oleite is in large excess, they harden by time. Many who have made a compound with a large percentage of such a drug as oxide of lead, then undertook to apply a thick coating as they would of a cerate, ointment or plaster, have found such a sticky compound that they were ready to condemn the use of such a preparation. Compounds of oleic acid were never intended to rub in, and compounds made clear with oleite cannot be applied by friction, as lard ointments or liniments. A thin coating is to be applied lighly. This will be readily absorbed, when another may follow. The minute glands and follicles have not the capa-

city they will not absorb like a sheep's wool sponge. In the writer's practice oleite has been used in varying proportions as an addition to any ointment in the Pharmacopœia, and many others, and found an improvement. Some preparations have acquired quite a local reputation.

In a brief report upon the use of oleite as an addition to the ordinary ointment bases, the writer suggested some formulas used by him in his own practice. They are certainly an improvement over ordinary fat bases. The formula suggested was to simply dissolve the drug in oleite, which was to be substituted for an amount equaling from 25 to 33⅓ per cent. of the fatty base, then after solution or emulsion the fatty base to be gradually added. Even these do not fulfill the standard sought for in this paper.

A leading dermatologist thus defines to the writer what a preparation for the skin should be. The base or vehicle carrying the drug should be at least absorbable enough to readily pass through the outer layer of the skin and readily enter the under layer. It should not be greasy or sticky, so as to soil or be removed by the clothing. It should be of such a consistence that when spread on cloth or the skin, it would not run when at the temperature of the body. The base should not be absorbed, leaving the drug caked upon the surface. From this and a study of the nature of the skin and its capacity for absorption, we see that the conditions to be met are somewhat as follows:

1. The base used must be of such substance as will allow the drug it carries to be readily absorbed.

2. The base should be readily absorbable, to carry the drug with it.

3. The drug must be either in some soluble form, or so minutely divided as to pass through the unbroken outer layer of the skin.

4. The preparation in itself must have the power of removing obstructions to absorption on both healthy and diseased skin.

5. It must have in itself the power of promoting absorption of products of inflammation.

6. It must in itself absorb and decompose the watery and fatty exudations of the skin when required.

7. It must be protection against external influences, especially where the outer skin is removed or broken.

8. It must be cleanly, so as to be applied to any part of the body under any circumstances.

9. It must be not only non-irritating, but soothing.

10. It must be of a form to be easily applied and easily removed.

That pharmacy has not yet produced preparations to fulfill these requirements is evident, and in looking over the suggestions in journals for the coming revision of our Pharmacopœia, the writer sees no indications that the demand of the medical profession will be met; possibly it cannot.

In this connection the writer notices that the main suggestion in the *Digest of Criticisms* for the sixth decennial revision, in the line of ointments and cerates, is in regard to their consistency, with the exception of the substitution of petrolatum for lard, which, for reasons stated, the writer would hold to be a misstep. The suggestions in the *Digest* in the line of emplastra refer likewise largely to consistence and spreading qualities, and there is a suggestion to authorize the use of a rubber base, which would likewise seem injudicious. Can we not do better? While science is doing so much in finding the cause of disease, chemistry offering daily new agents of instruction, cannot pharmacy take a step forward and perfect the mode of application?

Herewith are presented some samples of ointments and plasters made to illustrate the points intended to be urged by this paper.

They may not be what is desired, but are an attempt in the right direction, and an improvement on what what we ordinarily dispense, whether from our own laboratories or from the manufacturing pharmacist's hands. It is not the intention of the writer to extol the compound oleite, or the preparations made from it. They may be of only moderate service.

The ointments labeled "Gelatole" are made by dissolving the drug in oleite, and then combining with a suitable base, which if fatty is partially saponified, and to this adding an absorbent when required (to absorb the watery and other secretions), and finally gelatin, which gives consistency, and forms when rubbed down or dried a film or transparent coating. Their action is intended to prepare the skin by softening and dissolving the scales, dirt and dead excretions upon the surface, emulsifying the oily exudations, giving exit to the confined serum, stimulating the circulation of the blood in the diseased skin, and thereby promoting the absorption of the infiltrated products of inflammation, and by these absorbent qualities soothing inflammation, alleviating itching, and protecting the denuded epidermis from the drying action of the air and the irritating action of water and clothing. The detersive action in such a preparation is an important factor, as the preparationbe comes in a measure antiseptic, and the emulsifying or saponifying action displaces the fat of the skin until it becomes permeable and loses its capability of resisting absorption. In a measure it becomes for all practical purposes a mucous-like membrane. The plasters are made with a base composed of 66 per cent. fatty matter (a specimen of the plain base is also presented). This base is soluble and absorbable, so that if allowed to remain it will be entirely absorbed and nothing but the cloth will remain. In these preparations a very small percentage of drugs seems to give specific effects.

Attention is called to the sample of regular U. S. P. Ointment of zinc oxide, the sample being made in the ordinary way; also a sample of oxide of zinc ground in oil. It will be noticed that in the case of the U. S. P. Ointment and the oil preparation, the zinc remains as a coating

when applied to the skin. In the case of Gelatole ointment the zinc is in a soluble, absorbable form, and it almost immediately disappears—in fact it is absorbed.

ON THE POISONOUS PLANTS INDIGENOUS TO CALIFORNIA.

BY HANS HERMAN BEHR, M. D.

Professor of Botany in the California College of Pharmacy.

In the present state of our knowledge, the enumeration of the dangerous plants in a new country like California seems to partake somewhat of anticipation. But a beginning has to be made, and the circumstance of our very fragmentary knowledge, when exposed to the view of the profession, will act as a stimulus to the investigation of a matter of such vital importance.

Let us first consider those plants of whose dangerous qualities we might be convinced *a priori*, or which at least belong to genera where analogy with foreign species of the same genus or order justifies us in considering them dangerous.

We have two species of a cucurbitaceous genus, exhibiting a full measure of all the drastic properties developed by some other members of the order, namely, Megarrhiza (according to some botanists, Echinocystis), fabacea and Marah, both species comprised under the vernacular name of "Manroot."

The active principle seems to be most developed in the enormous rhizome. The presence of this active principle is the more to be regretted, as otherwise the considerable amount of starch contained in these rhizomes would make both of the species valuable food plants, like the yam of the tropics, to which the slender climbing stem proceeding from a giant rhizome bears a kind of external resemblance.

The intense bitterness of the rhizome warns the curious in time, and prevents accidents. The stem and leaves seem to be inert. The prickly capsule is full of a saponaceous juice, which disappears with the ripening. Neither the properties of the saponaceous juice nor those of the seeds have been thoroughly examined, and a close investigation may lead to the discovery of some new principle. In the meantime we must suppose that these parts bear an analogy to Colocynthis, in the same way as the rhizome coincides in many points with the root of Bryonia alba.

We have a species of Gratiola, Gratiola ebracteata, but it is doubtful if this little and rather rare annual possesses any of the properties that have given its European congener, Gratiola officinalis, its botanical name and its reputation amongst the farmers of the old continent.

We have two species of Solanum: Solanum nigrum, the common nightshade, which is not poisonous in California, at least under ordinary circumstances. The same species is common in Europe, where it is considered poisonous.

The second species, Solanum umbelliferum, has not yet been sufficiently investigated. Stem and leaves may act like those of Solanum Dulcamara, the bitter-sweet of our stores, which it resembles. As to its berries, I have no data.

Datura Stramonium (thorn apple) is common enough in some localities, and does not differ in any way from specimens derived from other countries.

Our beautiful Rhododendron occidentale, frequently called Azalea, contains in its roots a narcotic principle not yet sufficiently investigated. It may be that the leaves partake of the active principle contained in the leaves of the Siberian Rhododendron chrysanthum.

Ledum glandulosum (Labrador tea) deserves to be investigated as a narcotic. It resembles Ledum palustre so much that we may expect the same active principle, which in medieval times was used to make beer more intoxicating, and the prohibition of which for this purpose is one of the first instances of a sanitary law. The leaves at present are only in use for killing vermin on cattle, and fleas that infest rural abodes.

Caucalis nodosa and Caucalis microcarpa (Yerba de Vivora) are firmly believed by our old settlers to be infallible remedies for the bite of the rattlesnake. If they really cure snake-bite, or at least diminish its danger, they must possess a power that under ordinary circumstances might do harm. Both the plants comprised under the name Yerba de Vivora are insignificant looking annuals, and perhaps owe their reputation to the circumstance that they are strictly vernal, and not to be found when snakes are most likely to be met with. But we must not judge *a priori:* investigation may reveal powers which we did not expect in the herb.

The odor of Heracleum lanatum (cow parsnip) causes vertigo in some persons. Although these effects are neither constant nor general, an investigation is recommended, as it is of importance to know the properties of an herb of so frequent occurrence in the neighborhood of habitations.

Our Œnanthe Californica (fool's parsnip), notwithstanding its great resemblance to Œnanthe fistulosa of Europe, seems not to be poisonous.

Sium cicutæfolium (water parsnip) is decidedly poisonous, and the more dangerous as the taste of its root resembles that of parsnip more than any other of the poisonous Umbelliferæ. It is probably this plant that caused the disaster of Coyote Creek in the year 1869, where of a party of six prospecting miners, only three escaped with their lives.

We have three specimens of Cicuta (water hemlock) all of which, if not poisonous, are at least suspicious. As they are generally found in marshes or in otherwise not very accessible places, they are not apt to cause accidents.

It is not certain that Conium maculatum (the spotted hemlock) is originally a native herb. At present it is very common, and in some

localities forms thickets, whose nauseous smell is apt to affect sensitive constitutions. The disagreeable smell, however, serves as a kind of warning, and prevents accidental poisoning.

Eremocarpus setiger is used by the Indians to narcotize fish. Its properties, otherwise, are but imperfectly known. It smells like strawberries, but its dusty, straggling appearance is not calculated to invite passers by and so cause accidents.

Another Euphorbiaceous plant, Hendecandra procumbens (Croton Californicus) is a powerful drastic.

Our native species of Euphorbia are annuals, and I do not think that their milk is acrid enough to do harm; but Euphorbia Lathyris, a kind of spurge introduced from Europe, is a powerful drastic in all its parts. Rats do not like to dig in the ground where this plant grows in sufficient numbers.

Rhus diversiloba (our poison oak or Yedra) can not well be called a poison, as no case is known where this shrub and its exhalations have caused more than the temporary trouble of a skin eruption. All the cases where the eruption became permanent admit of the explanation that a predisposition for cutaneous troubles existed, which would have developed sooner or later without having received a start by the action of poison oak.

There does not seem to be anything specific in the action of the shrub. Many people are afflicted in a similar way by inhaling the vapor of turpentine on visiting a newly painted room. Our poison oak, as well as the Rhus Toxicodendron of the Atlantic States, requires an idiosyncrasy in the individual to act upon, or else it remains inert. I have remarked the same peculiarity in the case of the dreaded Semecarpus of the East Indies, and I should not wonder if the terrors of Rhus caustica in South America, and of the Melanorrhœa (the Japanese varnish tree), rest on a similar exaggerated action, and would by a close investigation resolve themselves into an inconvenience befalling only those who are liable to be affected in that way.

As to antidotes, there exists no specific for the cure of the eruption if it is once fairly established. The exanthema has to be treated according to general rules. Nevertheless, there seems to be a foundation for the belief of our fellow citizens of Spanish descent that an infusion of the leaves of Rhamnus Californica (Cascara sagrada) used as a wash, acts as a preventive. But as this remedy, to be of any use, must be applied before the eruption has developed, and as the receptivity for the noxa in the majority of people is altogether wanting, it is difficult to judge about the merits of the application. It is true that I know of a few cases of persons formerly liable to be affected, who have been exempt since they have used the wash immediately after each exposure.

The second Californian species of Rhus, Rhus aromatica, is entirely harmless, and its berries are edible.

Actæa spicata (Baneberry) is rather local. The beautiful coral red berries look inviting enough, but I have never heard of any accident.

A species of Delphinium is dreaded by herders, who frequently lose sheep by this plant, but it is difficult to identify the species from their vague descriptions. All we can make out from their statements is, that it must be a perennial, growing, when in flower, above the height of a man.

Our species of Ranunculus lose their poisonous acridity by drying, so that hay is not affected by their presence.

It is the reverse in regard to our Prunus ilicifolia, a kind of wild cherry, whose foliage develops its poisonous properties only during the process of withering. This peculiarity causes occasionally the loss of a sheep or a cow, because these animals acquire the habit of browsing on the trees which grow near the trail that leads to their pasture grounds, and do so with impunity, until some day they encounter in a tree, on which they have browsed every day, a branch that, perhaps in consequence of an injury, has begun to wither.

The notorious Loco-weed is an Astragalus, but the exact species is not known with certainty. There may be several species of Astragalus that develop a curious poison of exceedingly slow action, corresponding in some way in its effects to a poison observed in some Australian plants of the same Leguminous order, belonging to the genera Gastrolobium, Oxylobium and Isotropis.

Here, as well as in Australia, these plants have been experimented with, but without enabling the investigator to come to any decisive conclusions. Two things, nevertheless, in both countries have been established:

1. Dogs, cats and rabbits do not suffer if the seeds or herb of these plants is mixed with their food.

2. Cattle, sheep and horses suffer only in certain seasons.

As to the first circumstance, respecting the established fact that cats, dogs and rabbits enjoy an immunity in regard to this poison, we have only to recollect that goats eat hemlock, and rabbits belladonna, with impunity, and we will understand that the immunity of these animals does not prove anything as to the dangerous qualities of the same herb in regard to cattle, sheep or horses.

The other circumstances, that the Loco poisoning only takes place under certain circumstances, and not in every season, admits of several hypotheses. The poisoning may be owing either to the invasion of some fungoid parasite, perhaps of the Claviceps order, or by a substance produced by fermentation or putrefaction, in which case the materia peccans would be some ptomaine; or lastly, the poison may not be of vegetable origin at all, but some animal parasite infesting the suspected plant.

The question is a very complicated one, and as Loco poisoning in

some years entails a perceptible loss of stock, it is of sufficient importance to justify an appropriation for a body of scientists to inquire into the causes of the malady, and find a remedy for them.

The ptomaine hypothesis would explain the curious slow action and chronic course of the Loco disorder in the affected animals.

In the *American Journal of Pharmacy* (May, 1880), I find a notice to the effect that the efforts of the government of the Australian colony of Victoria to unravel the mystery have brought the matter a step nearer to the discovery of the real cause of these accidents. My old friend, Baron Ferdinand von Mueller, combining his efforts with those of the accomplished chemist, Mr. Rummel, has discovered a peculiar resin and a glucoside in the Australian herbs, which latter is probably the cause of the poisoning.

Polygonum nodosum, an aquatic species of knotgrass, resembles Polygonum Hydropiper, its European congener, in appearance and taste, which from its acrid pungency has been named water-pepper, and is considered dangerous.

Our two species of Trillium (wake-robin), are suspicious and should be investigated.

The same is desirable in regard to our species of Fritillaria (chessboard flower), notwithstanding the statement of the Russian traveler and scientist, Pallas, that the inhabitants of Kamschatka eat with impunity the bulbs of our Fritillaria lanceolata, which is found in their country as well as in California.

We have in the Sierras two species of Veratrum, undoubtedly poisonous.

In regard to Zygadenus venenosus, the qualities are not sufficiently known. It is certain that the root is as little poisonous to hogs as hemlock is to goats; but in Oregon and Northern California, where the edible bulb of Camass (Cyanotris esculenta) forms an article of food to Indians, and frequently occurs in company with Zygadenus, the latter is called "death-camass."

As to Lolium temulentum, the Darnel, it is still undecided if this grass is poisonous at all times, or only becomes so under certain circumstances.

In regard to poisonous Fungi, it is a curious circumstance that all Californian species which could become dangerous, belong to the Agaricus group. All the fungi of this group can easily be distinguished by their possessing gills underneath their umbrella-shaped stroma or heads. It is true that not all of these fungi are poisonous, and some of our best table mushrooms belong to this order, *viz.:* Agaricus campestris, sold in our markets, and cultivated for this purpose.

The danger exists in the wild species of Agaricus, in which the wholesome and the dangerous resemble each other so much, that it takes the experienced eye of the collector to distinguish between them.

All the California fungi not belonging to the Agaricus order are either uninviting by smell and appearance (such as the Phallus), or are entirely harmless and wholesome food, *viz*, the Boletus, and the much calumniated Puff-ball (Lycoperdon), of which we have here a giant species.

The present essay, as I stated in the beginning of this article, is only intended to draw attention to this most important part of our flora, medical and pharmaceutical, and in the hope that further investigation may be made into the hidden treasures which will be revealed by a study of the poisonous plants of California.

THE PINES OF CALIFORNIA.

BY JAMES G. STEELE.

The name "California" has interested the general eye and ear as much as that of any other New World province. From the time when it was a mere field of cosmographic conjecture, it has drawn upon itself a liberal share of the world's notice.

Previous to the occupation of the country by the Americans, owing to its situation, from the ocean, as on a great maritime highway, California was visited by explorers and traders from all parts of the world. Over the mountains, later, came adventurous path-finders, followed by swarms of Anglo-Saxon immigrants to seek homes by the Pacific. Then came the "Conquest," the change of flag, and finally the founding of a *New State*, soon followed by the establishment of Sister States and Territories.

The physical features of the State are pretty generally known, and some insight has been had of its enormous capabilities from an utilitarian and economic point of view, as well as the vast field for scientific research afforded by its mighty mountain chains, broad pampas-like valleys, inland lakes and streams, and long stretch of sea-coast laved by the waters of the broad Pacific.

In an empire so vast as California, embracing every conceivable variety of known soil, from alluvial sedimentary deposits of inexhaustible depth and fertility, to sterile and almost denuded mountain sides, and exhibiting within its boundaries a surprising range of meteorological conditions, comprising nearly all variations, from the continuous dew-point to almost perfect atmospheric hydration, and with a rainfall varying from fifty inches in a season to practically nothing, with varying degrees of altitude from sea-level to the limit of perpetual snow, there might be expected a most diverse *flora*, marked by strong individual peculiarities!

The mountains of California are covered with forests of pine, cedar and fir, exhibiting a great preponderance of coniferous over dicotyledonous trees, these conifers being restricted for the most part to the sea-coast and the mountain sides. Our streams are fringed with various deciduous trees and shrubs, whilst in the vast plains and prairie country of the valleys, the prevailing plants are *Gramineæ*, *Compositæ*, *Leguminosæ*,

with a greater number of *Liliaceæ* than in any part of the Eastern States. This proportion seems to hold good until the foot-hills of the Sierra Nevada are reached, where a greater variety of species, as well as genera and classes are met with.

Here the *Gramineæ* diminish in number, while the *Cruciferæ* and the *Compositæ* greatly increase. Here, also, the *Rananculaceæ* and *Geranieæ*, with numerous variously colored and brilliant *Labiatæ* occur; some of these mountain meadows, by the great variety of their flowering plants, outvy in this respect the most carefully selected flower gardens of the East.

The same remark applies to the vegetation covering the several mountain ranges, these differences of form being so notable as to entitle them to a special Flora. Sometimes these distinctions are so broadly marked and obvious as to strike the casual observer, while again they are so slight and difficult of detection as to be found only by careful scientific analysis. The *Sierra Nevada*, the great mountain range of California, traverses nearly the entire length of the State, enfolding in its lap most of its Eastern boundary.

The Sierra is distinguished for the abruptness of its uprise from the great Western plains of North America, the splintered and rough-hewn forms of its thousand peaks, the high elevation of their pinnacles, mostly crowned with an everlasting coronet of snow! But more than all, this range is pre-eminent for its bounteous and beautiful enrobing *forest*, by which it is wrapped from head to foot for six hundred miles in length, and from side to side, one hundred and fifty miles. This is a dense forest of evergreens, interspersed with many-hued, deciduous-leaved trees, like insertions of brilliant figures in a royal emerald robe.

The Sierra of California occupies a middle position between torrid and frigid temperatures, a position favorable to the production of large forests, containing many species of noble trees, mainly evergreen, not one species of which is identical with the trees of the Eastern States (with one exception, in a representative of the Juniper family), but it shares several species with the Rocky Mountains on the East and the Coast Range of mountains on the West.

From an elevation of 4,500 to one of 8,500 feet, extending along the entire length of the Sierra, lies the *Grand Coniferous Forest of California*.

When viewed from a distance, it presents the appearance of a dense and gloomy mass of timber; but upon entering its territory, the openness of the growth and the absence of underbrush is a most striking feature, seeming as though these grand forest monarchs need an abundance of breathing space, and could not tolerate minor growths even around their feet! The lower portion of this forest is composed chiefly of pines, both yellow and sugar; then, as the middle elevation is approached, the firs

are about equally represented, and become more numerous as you ascend, the sugar pine gradually disappearing. Intermixed with the larger growth are numerous species of smaller trees, the most important being madrona, laurel, aspen, birch and mountain mahogany. Dr. Engelman, in his "Revision of the genus *Pinus*," enumerates seventy-six species as the product of all the earth, putting twelve of the names in parentheses as synonyms, or marked varieties. Of these, thirty-four species are within the United States and Territories, with seven under his synonyms. In the *Botany of California*, Vol. II, he describes *fourteen* species and *five* varieties, the latter being *albicaulis*, *aristata*, *Jeffreyi*, *scopuloruu* and *Murrayana*.

In this description of *California Pines*, I shall follow the classification and arrangement of Prof. J. G. Lemmon, Botanist for the California State Board of Forestry, whose zeal, ability, and enthusiasm are known and recognized by all who have made a study of the botany of California.

The genus *Pinus* belongs to the great class of

GYMNOSPERMÆ,

plants with ovules orthotropous, naked upon the surface of a scale or bract, within a more or less open perianth, fertilized by the direct contact of the pollen with the nucleus; flowers monœcious or diœcious; cotyledons usually more than two, in a whorl; wood composed mainly of disk-bearing tissue without proper vessels. The class comprises

Order *Gnetaceæ*—Joint-stems.
" *Taxaceæ*—Yew trees.
" *Coniferæ*—Cone-bearers, the genus *Pinus* belonging to the latter.

CONIFERÆ (*cone-bearers*),

an important order of exogenous plants, containing the Pines, Firs, Junipers, Yews, etc., agreeing with the other exogenous orders generally in the structure of the stem and in the mode of vegetation, but differing remarkably from most of them in having naked ovules, *i. e.*, ovules which are not enclosed in any ovary, but are fertilized by the direct application of the pollen to the *foramen*, without the intervention of the style or stigma—and upon this account separated from them, along with *Cycadaceæ* by Lindley, Endlicher, and others, as a distinct class, under the name *Gymnogens gymnospermæ*. Resinous, mostly evergreen trees, with usually acerose or scale-like leaves, monœcious or rarely diœcious. The flowers are unisexual, the male and female sometimes on the same, sometimes on separate plants; the male flowers have either one stamen or a bundle of stamens, the anthers often crested; the female flowers are in cones or solitary; the place of ovaries is supplied by the flat scales of the cones; the ovules are usually in pairs on the face of the scales, either inverted or erect.

The fruit is either a cone, the scales of which sometimes become fleshy,

and are incorporated into a berry-like fruit, or a solitary, naked seed. The seed has a hard, crustaceous integument; the embryo is in the midst of fleshy, oily albumen; the cotyledons are either two, or numerous and whorled. The mode of branching is peculiar, numerous buds proceeding from the side of the main stem, so as generally to form whorls of branches, which are generally almost horizontal in their direction, whilst the central vertical shoot runs up often with admirable straightness, and some of the *Coniferæ* attain a height unrivalled among other forest trees, of which the *Wellingtonia* of California affords the most noble example.

The wood consists of punctated cells; the sides of the tubes or elongated cells which form it, and which are nearly of equal diameter, being marked by circular disks, which, when highly magnified, exhibit a small internal circle surrounded by a large external one. This peculiarity of the wood of the *Coniferæ* is important, as enabling us to recognize it in a fossil state, and to refer many fossils, particularly of the coal formation, to this order.

The leaves of the *Coniferæ* differ widely from those of the closely allied order *Cycadaceæ*. Most of the *Coniferæ* have very narrow; veinless leaves, so that the Germans call them "needle-woods" in contradistinction to the other European forest trees, which they call "leaf-woods." By far the greater number of them belong to the northern hemisphere. The *Coniferæ* are very long-lived; some of them are supposed to be capable of attaining an age of two or three thousand years! When the stem of a coniferous tree is cut across, it does not sprout again from the root.

The *Coniferæ*, besides the great usefulness of the timber of many, are remarkably productive of turpentine and resins. Astringent substances are also found in their bark, and fixed oil in their seeds. The seeds of some species of Pine and Praucaria are used as food.

Some of the Conifers of California have persistent cones, which they retain from ten to twenty years in some instances. Others, again, retain their cones two years, while still another class throw off a series of cones every year. It is noteworthy that all the conifers of the Pacific Coast exhibit a symmetry and perfection of figure, as well as a healthfulness and vigor of growth not attained by similar trees in any other part of the world.

The *Conifers* are trees (or shrubs) of cold or temperate latitudes, principally comprising three *Tribes*,

Cupressineæ—Cypresses.

Taxodineæ—Sequoias.

Abietineæ—Firs, Spruces and Pines, our genus thus in the last Tribe.

ABIETINEÆ.

Scales of the fertile ament numerous, spirally imbricated, carpellary, each in the axil of a thin bract, in fruit becoming a coriaceous or ligneous strobile or cone. Ovules, two, adnate to the inner face of each scale near the base, inverted. Seeds usually separating from the scale at ma-

turity, and carrying away a conspicuous, scarious wing. Cotyledons three to sixteen. Anther cells, two, extrose, parallel and contiguous upon the sides of the connective, which is often surmounted by a scarious, dilated, inflexed tip or crest. Leaves scattered, in the genus *Pinus* from linear to acerose. Leaf buds scaly. Contains five Genera, the four first named maturing their cones in one year.

1. *Abies*—the *Firs*. Leaves sessile, leaving circular scars; cones erect, their scales deciduous from the axis. Seeds with resin vesicles.

2. *Pseudo-Tsuga—Douglass Spruce*. Leaves petioled, the scars transversely oval; cones pendulous, scales persistent. Seeds without resin vesicles.

3. *Tsuga—Hemlock*. Branchlets rough from the prominent, persistent leaf-bases, bracts of the cone smaller than the scales; cones pendulous. Leaves petioled, with a single dorsal resin duct. Seeds with resin vesicles.

4. *Picea—Spruces*. Having also the characters of *Tsuga*, except leaves sessile, heeled on both sides with two lateral resin ducts. Seeds without resin vesicles.

5. *Pinus—Pines*. Cones requiring two (in one European species three) years to complete their growth, their bracts becoming corky and thickened; leaves (the conspicuous foliage) in fascicles of two to five (solitary in one species, the *P. monophylla*) from the axil of scarious bracts, their base surrounded by a sheath of scarious bud-scales usually serrulate. Pollen two-lobed. Resin ducts inconstant in number, usually numerous, variously situated.

The California Pines, in common with other forest trees, have engaged the attention of many botanists. Our space will not permit us to mention, even, the many explorers who have written of our forest trees, not a few of whose names are embalmed in the titles of the different genera and species.

The *Pine* is a genus of the natural order *Coniferæ*. The Linnæan genus included all kinds of fir, larch and cedar; but as now limited, the genus *Pinus* is distinguished as a resin-producing, cone-bearing evergreen tree, with principal foliage composed of secondary leaves, which are acerose (needle-shaped), usually rigid, mostly triangular, and in fascicles or bundles of two to five each (solitary and round in one species) their bases surrounded by a sheath of scarious bracts or bud scales, usually close-wrapped and persistent.

The flowers are monœcious, *i. e.*, they are on the same stem, but separated, the male or pollen-bearing on a different branchlet from the female or fruit-bearing one, which becomes the cone. The fruit is either subterminal (arising near the terminal leaf-bud), or it is lateral, arising along the stem among the leaves of the growing shoot. It is composed of numerous spirally-imbricated, carpellary scales, each in the axil of a

thickened, corky bract (much modified and concealed at maturity), and each bearing two, usually long-winged seeds at base; the whole fruit requiring two years to complete its growth (three for one European species), and becoming a coriaceous or ligneous *strobile* or *cone*. Cotyledons or seed-leaves numerous, in a whorl of four to sixteen.

To this genus belong many noble and useful trees. They mostly grow in mountains or other exposed situations, and their narrow leaves are admirably adapted to evade the force of the winds, which produce in the tops of pines a peculiar sound, much noticed by the ancient poets, more soft and continuous than in trees of richer foliage. Most of the Pines are more or less social, one kind often covering a considerable tract; some of them clothing the sides and even the summits of mountains with magnificent but sombre forests; some growing in lower situations, or otherwise unproductive sandy grounds, as in the *Pine-Barrens* of North America.

The Pines growing in the most barren soils, or in the coldest climates and most exposed situations, are often very small; and although very unlike any other shrubs or bushes, are scarcely to be called trees. Pines are widely diffused over the Northern Hemisphere, being found on mountains within and near the tropics, and in the colder temperate and the arctic regions, descending to the level of the sea.

THE PINES OF CALIFORNIA.

have been divided by later botanists into *Two Classes*, comprising *Six Groups* with eighteen sub-divisions.

Class 1.—Smooth-Coned, White Pines.

Group 1. *Long-Cone Lumber Pines.*
No. 1. *Pinus monticola*—Mountain Pine, Finger-cone Pine.
No. 2. *Pinus Lambertiana*—Sugar Pine, Gigantic Pine.

Group 2. *Dwarf Cone, Alpine Series.*
No. 3. *Pinus flexilis*—Limber-twig Pine, Western White Pine.
No. 4. *Pinus albicaulis*—White-bark Pine, Creeping Pine.

Class 2.—Rough-Coned, Pitch Pines.

Group 3. *Entire-cone, Close-grained Pines.*
No. 5. *Pinus Balfouriana*—Fox-tail Pine, Spruce Pine.
No. 6. *Pinus aristata*—Bristle-cone Pine, Hickory Pine.
No. 7. *Pinus monophylla*—Single-leaf, Fremont's Nut Pine.
No. 8. *Pinus Parryana*—Parry's Pine, Mexican Piñon.
No. 9. *Pinus contorta*—Scrub Pine, Twisted Pine.
No. 10. *Pinus Murrayana*—Tamarack Pine, Murray's Pine.

Group 4. *Base-broken-cone, Lumber Pines.*
No. 11. *Pinus ponderosa*—Yellow Pine, Heavy Pine.
No. 12. *Pinus Jeffreyi*—Black Pine, Sap-wood Pine, Jeffrey's Pine.

Group 5. Heavy, Spine-cone Long-limbed Pines.

No. 13. *Pinus Coulteri*—Big-cone Pine, Coulter's Pine.
No. 14. *Pinus Sabiniana*—Gray-leaf Pine, Sabine's Pine.
No. 15. *Pinus Torreyana*—Torrey's Pine, Lone Pine.

Group 6. Long-closed cone, Slender Pines.

No. 16. *Pinus insignis*—Monterey Pine, Remarkable Pine.
No. 17. *Pinus tuberculata*—Knob-cone Pine, Sun-loving Pine.
No. 18. *Pinus muricata*—Prickle-cone Pine, Swamp Pine.

CLASS I. SMOOTH-CONED, WHITE PINES (sub-genus *Strobus*).—Cone scales smooth, devoid of protuberances, prickles or hooks; wood usually lighter colored, softer and less resinous than that of the other class. Cone, sub-terminal, mostly long-peduncled, and falling at maturity; scales, usually numerous and flat; leaves short, two to three inches long, in fascicles of five each, with short, loose, deciduous sheaths at the base. Male flowers oval, small, one-quarter to one-half inch in length. Five species on the Pacific Coast, four of them in California. (*P. monticola, Lambertiana, flexilis* and *albicaulis.*)

GROUP I. LONG-CONE LUMBER PINES.—Cone long, cylindrical, eight to twenty inches in length and one to three inches in thickness, many-scaled, long-peduncled, becoming pendent. Principal spirals, eight inclining to the left, thirteen to the right. Seeds large, dark, with long, brown, persistent wing. Trees usually very large, with finely-checked bark, large and long upper bearing limbs and light-green foliage. Timber of great value.

No. 1. *Pinus monticola*—MOUNTAIN PINE, FINGER-CONE PINE.—A tall tree, found on higher elevations than its congener, the *Great Sugar Pine.* Grows mostly near the summits of the Sierra. Like the other species it is greatly varied. Trees are found with deeply-furrowed, reddish or dark bark and long purple cones, nearly a foot in length. It dwindles to small spindling trees in the highest altitudes, with diminutive cones like ladies' fingers. Fine timber, but little cut for lumber on account of its inaccessibility. The Mountain Pine makes its first appearance on the upper margin of the "fir belt" of the Sierra, at an altitude of five thousand feet, as a scattered growth, but gradually increasing in numbers until at ten thousand feet it is the prevailing tree. It is a hardy and long-lived tree, gaining in size and strength just where other trees weaken and disappear, and at its best development is one hundred feet high.

P. monticola, variety *minima*—LITTLE MOUNTAIN PINE.—On the Nothern cross ranges of the Sierra, and on the Coast Mountains, grows a dwarf variety of this species that is small and often very slender, with diminutive cones. The bark is very thin, smooth and white. Cones purple until maturity, and two to three inches in length. Seeds minute.

No. 2. *Pinus Lambertiana* — GREAT SUGAR PINE.— This tree fre-

quently grows to the largest dimensions—from 120 to 200 feet, and favorably situated to be seen growing quite commonly from 250 to 300 feet in height, and from six to fifteen and sometimes twenty feet in diameter. Scattered among other trees of the Coast Mountains and the Sierra at middle elevations. Bark thick, dark and irregularly fissured. Yearling cones long, yellowish or purple, cylindrical, one to two inches long with appressed scales. Mature cones long-elliptical, ten to twelve, rarely fifteen to twenty-two inches long, and two to three thick, becoming, when expanded, four to six inches thick. Seeds very large, about one-half an inch long, edible, with large wings an inch long and thickly veined with reddish brown. The sugar pine is the most distinguished and valuable of Western pines, and far exceeds in dimensions any other member of the family. The leaves are three inches in length, of a dark bluish-green; grow mostly in groups of five. Foliage not dense. David Douglass, the discoverer of the Great Sugar Pine (1826), calls it "the most princely of the genus, perhaps even the grandest specimen of vegetation known!"

The wood of this tree is similar to the White Pine (*Pinus strobus*) of the Eastern States—white, soft, homogeneous, straight-grained, clear and free from splitting; it furnishes the best lumber in the State for "inside work" of houses, being the chief building material used in the Sierra Nevada, where it grows, and in adjacent sections. The tree derives its name from a sweet resinous gum which exudes from the duramen or hard wood portions. This substance in appearance, granulation and taste, resembles the manna of the drug stores, except by a slight terebinthinate flavor.

A peculiarity of these trees is the specialized long upper limbs and the short lower ones, which soon decay and fall; thus the trees, self-trimmed while yet small, swell out their matchless trunks with smooth bolls reaching up to the great limbs, affording the longest clear-cut lengths for saw-logs of any tree known.

GROUP 2. DWARF-CONE, ALPINE PINE.—Dwarfed, often depressed trees, forming the upper fringe of Alpine forests in the Sierra and northward. Cones, sub-cylindrical or ovate, shorter with fewer scales, two to six inches long. Seeds large, nearly wingless. Bark thinner and lighter color than that of the first group.

No. 3. *Pinus flexilis*—LIMBER-TWIG PINE, WESTERN WHITE PINE.—This pine grows in the form of a low scrubby tree on windy heights, so stout that a man can stand on its top. They are found in the Rocky Mountains, as well as in some parts of the Sierra. Yearling cones, one inch in length, purple. Mature cones four to six inches in length. Twigs very flexible, yielding to pressure from snow, ice and wind.

John Muir says of the *P. flexilis:* "A certain tree that was three and one-half inches in diameter, and hardly three feet high, when cut half

way through revealed no less than 250 rings; another similar one was 420 years old. One of the small branchlets, hardly half an inch thick, displayed seventy-five rings, and was so filled with balsam, and so seasoned in storms, that we might tie it in knots like whipcords."

No. 4. *Pinas albicaulis* — WHITE-BARK PINE, CREEPING PINE.—Dwarfed, very white-barked trees of the Northern Rocky Mountains, and rare in the Sierra, notably forming the timber line of Shasta. Yearling cones globular, half an inch long, dark purple. Mature cones small sub-globose, one and one-half to two inches long, deep purple until maturity. Seeds pale, nearly globular. These pines, with their brethren, the *P. flexilis*, climb up to, and cling stoutly to, the bare, bold rocks of the Sierra peaks, or they grope resolutely, though prostrated by torrents and gales, along the glacier-smoothed passes. The flowers of these pines are rarely attractive, being large spikes of rose-red stamens, set off with tufts of the short leaves beneath them.

CLASS 2. ROUGH-CONED, PITCH PINES.— Cone-scales rough, armed with conspicuous protuberances, prickles, or hooks. Wood usually darker, harder, more resinous than that of the first class. Eighteen species on the Pacific Slope, thirteen in California, subdivided into groups, with an intermediary solitary species.

PLUME PINES (OBLONG-CONE).—Cones oblong cylindrical, three to five inches long, one-half to one and a half inches thick, pendent from the ends of the long branchlets; scales numerous and nearly flat; leaves mostly in fives, persisting for many years, ten to twenty, very short and appressed to the branchlets—whence the resemblance to plumes—sheaths loose, deciduous. Sub-alpine, spire-shaped trees of the Rocky Mountains, with a few groves in the high Sierra. Wood reddish, cross-grained and exceedingly tough. Bark reddish brown, deeply fissured.

The sub-alpine Pines are very interesting trees, at first seeming not to be pines at all, but spruces, from the similarity of their close-clothed limbs and small depending cones. They are so high in the alpine forests that only the hunter or explorer is apt to know of them.

No. 5. *Pinus Balfouriana*—FOX-TAIL PINE, SPRUCE PINE.—This singular spruce-like Pine is of extremely limited and local development. It is found in a few groves of the Alpine Sierra from Scott Mountains to the headquarters of Kern River, growing at an elevation of from 5,000 to 8,000 feet. The trees are frequently 80 feet high, by about 3 inches in diameter.

No. 6. *Pinus aristata*—BRISTLE-CONE PINE, HICKORY PINE.—This beautiful tree, also a lover of Alpine heights, though prevalent on the highest peaks of the Rockies and the mountains of Arizona, is quite local in California. Prof. Lemmon detected it in the high Sierra back of Yosemite, and upon Mount Agassiz of Northern Arizona, at an elevation of ten thousand feet.

John Muir writes of this tree: "Grows on the headwaters of the Middle Fork of King's River, how much farther north I cannot say, but certainly its development extends to elevations of about ten thousand feet in sheltered valleys, on coarsely ground moraines or fissured table-lands, and runs up to the limit of tree life on the summit. It combines gracefulness of habit with strength and flexibility in a marvellous manner. It is certainly the most variably graceful of the *Sierra Pines*.

GLOBE-CONE, NUT PINES.—Cones sub-globose, one and one-half to two inches long, scales few, very protuberant and unarmed, widely opened at maturity. Seeds very large, wingless and edible. Leaves heavy-scented with deciduous sheaths. These species are generally found on low hills, or sunny, undulating plains, and they spread out their strong limbs, easily reached. The cones are unarmed, few-scaled, and contain comparatively the largest, most delicious and nutritious seeds of any trees of the family.

No. 7. *Pinus monophylla*—SINGLE LEAF, FREMONT'S NUT PINE.—This curious little Pine was first discovered by Fremont in 1844, near the site of the present city of Carson. He called it "one-leafed Pine," and it is sometimes called *P. Fremontiana*.

These Pines, in open situations, as upon the low hills near Carson, Nevada, become round-headed, freely branching from the base; but in the gulches of the Sierra they are spire-shaped, or even tall and slim. There are trees in Tehachapi Mountains, four feet in diameter and nearly one hundred high. But the trees of the Sierra are generally decrepit and much broken by winter storms. In sheltered situations beautiful trees are seen, of pyramidal outline, often heavily fruited, so heavy that their limbs are bowed to the ground. The cones are usually quickly deciduous.

Formerly the nuts of this Pine were collected in great quantities annually by the Washoe tribe of Indians for food. At the harvest time, nearly the whole tribe with their ponies would proceed to the groves of trees and camp by them. With long poles the cones were beaten off by the men, the boys climbing such trees as admitted of it, to secure the fruit, which was taken by the squaws, piled in heaps, with leaves and earth thrown over them, and then set on fire. When roasted several hours the cones will be found opening and discharging the large and delicious kernels.

There has been much discussion ever since the discovery of this tree, upon the character of its leaves, and eminent authorities have held opposing views; some declaring that the leaves were truly single and solitary, others that the terete foliage was due to the firm agglutination of a pair of leaves. It is now, however, very generally concluded that the monophyllous shaft of this Pine owes its peculiarity to the generally arrested development of one of its two original leaves!

No. 8. *Pinus Parryana*—PARRY'S PINE, MEXICAN PIÑON.—Trees

similar to preceding, but smaller. In the mountains of Lower California, a few trees crossing the boundary-line into San Diego county, and found on the Cuyamaca Range of mountains. Cones small, with soft-shelled seeds. Leaves in fascicles of four or five. This tree, the rarest (but one) of all the species of the *Pines*, is the Piñon or Nut-pine of San Diego county, and named for Dr. C. C. Parry, the veteran botanist, who discovered it during the survey for the Mexican Boundary, in 1848.

THIRD PAIR. THIMBLE-CONE, THIN-BARK PINES.—(*P. contorta* and *Murrayana.*)—Cone, sub-cylindrical, one to two and one-half inches long, strongly declined, falling at maturity or persisting indefinitely. Male flowers very small; leaves in pairs; seeds and wings very small. These Pines present often an appearance of attenuated thin-barked trunks, attacked at all periods of growth by various enemies, animal and vegetable. Occasionally, however, one is found that has resisted their attacks, and so presents a full, crowned head of foliage.

No. 9. *Pinus contorta*—SCRUB PINE, TWISTED PINE.—Small, scrubby trees in swamps on the Northern sea-coast. Yearling cones globular, minute, one-eighth of an inch long, with pointed, spreading scales. Mature cone, sub-cylindrical, one to two inches long, very strongly declined and long persistent, at length almost concealing the foliage. Seed minute, with very small, narrow wing. Is furnished with irregular, spreading branches, thick rimose bark, and resinous wood. The leaves are invariably in pairs, and slightly silvery on the lower surface. Found in the lower Sierra and the Coast Range.

No. 10. *Pinus Murrayana*—TAMARACK PINE, MURRAY'S PINE.—Usually tall, slender trees, in wet sub-alpine valleys of the Sierra and Rocky Mountains. Yearling cones globular, one-fourth inch long, with pointed, spreading scales. Mature cones ovate-conical, one and a half to two and a half inches long, less strongly declined and usually deciduous. Beautiful trees, when in open situations. Bark one-fourth to one-half inch in thickness. Trees much attacked by parasites and other enemies, and so discharging resin or pitch, hence often called "Pitch Pines." This tree is found in high, wet valleys of the Sierra, and is widely disseminated.

Wherever this tree escapes all enemies, which take advantage of its thin bark, and it attains its full stature, it is often a very tall and graceful tree, notably in the forests around Webber and Donner lakes of the Sierra, at altitudes of 4,000 to 7,000 feet, usually occupying the ground to the exclusion of all other trees.

GROUP 4. BROKEN-CONE PINES. BASE-BROKEN CONE, LUMBER PINES, (*P. ponderosa, P. Jeffreyi*).—Cone breaking away at maturity by a transverse fracture within the base, rendering it thereby truncate at the base, and leaving persistent on the limb its undeveloped basal scales. The cones are ovate-conical, sessile, or nearly so, spreading or slightly

declined, many-scaled, five spirals inclining in one direction, eight the other. Seeds about half an inch long, wings transparent, beautifully veined with brown. Leaves in threes, and five to eight inches long; sheaths long, close-wrapped, and persistent. Male flowers large and long. Bark usually very thick and deeply fissured. Trees of the largest dimensions, widest distribution, and of the utmost value for lumber, fuel, etc.

No. 11. *Pinus ponderosa*—YELLOW PINE, HEAVY PINE.—This tree, when fully developed, is of the first class, being six to ten, even fifteen to twenty feet in diameter, and 150 to 200, sometimes 250 to 300 feet in height. Its bark is usually whitish-yellow, generally thick (four to six inches) and deeply fissured, crumbling before the woodman's axe, and releasing a great quantity of yellow or orange-colored powder.

This tree is noted for its annual layers being soon converted into "heartwood" at an early age. The leaves are from six to eight inches in length, and dark green in color; in old trees, two or three years' growth remain on the tree at a time on the twigs, thus presenting a tufted or brush-like appearance. The cones are small, two to four inches long, brown externally, mahogany within; the scales with small, erect or incurved prickles. There is noted much irregularity about the spiral arrangement of the scales.

The cones, when matured, separate from the tree by an irregular transverse fracture, within the base of the cone, exposing the conical lower end of the receptacle, and leaving persistent on the branchlet the small, undeveloped basal scales, surrounding a conical pit corresponding to the removed receptacle. In the middle Sierra, the cones mature and begin to fall about the middle of September, continuing for a month or more. The yearling cones are elliptical, one-half to one inch long, the pointed scales appressed and directed towards the apex.

The Yellow Pine of California has the widest distribution of any other timber tree. Prevalent in most parts of the Sierra Nevada. This tree, however, rarely comes down the mountain slopes to the edges of the great valleys and basins, but is there supplemented by other species; nor does it ascend the slopes to the timber limit, giving way there also to other species. It is found in elevations ranging from 5,000 to 7,000 or 8,000 feet.

The Yellow Pine rarely occupies the ground to the exclusion of other trees, but is most frequently accompanied by other species of its own interesting family, and by allied congeners, of which there are many species of spruces, firs, hemlocks, cypresses, larches, junipers, etc., in the region mentioned, and in a few localities, oaks, poplars, laurels, and other broad-leaved trees.

There are three sub-varieties of this species of Pine, the *P. Benthamiana* (Foot-hills Yellow Pine), *P. brachyperta* (Southern Yellow Pine), and *P. scopulorum* (Rocky Mountain Yellow Pine).

Individual members of this Pine are met with of immense size and noble appearance. One, a native of Sierra Valley, was 320 years of age, 250 feet high, six feet in diameter, with bark five inches thick, in large, longitudinal plates, and crumbling before the axe in scores of small, rounded buttons, one to two inches in diameter. Specimens of this tree, wood, bark, boughs, fruit, etc.—were sent to the Centennial Exhibition (at Philadelphia) as representative of the typical Yellow Pine of the Sierra.

No. 12. *Pinus Jeffreyi*—BLACK PINE SAP-WOOD PINE.—Similar, but not so large trees as the typical forms of the other species, usually more spire shaped and symmetrical. In the Sierra, with a variety southward to Lower California. Bark dark, often reddish or black, and hard, fissured into small plates. Sap-wood usually very thick, often composing the most of the timber, whitish; heart-wood consequently meagre, not so light-colored as the other species, often very resinous. Yearling cones purple, larger, elliptical, one to one and one-half inches long, with larger prickles, which are strongly deflexed. Mature cones usually much larger and more truncated, elongated five to six, often eight to ten inches in length, and half as wide when expanded; prickles strongly deflexed, giving one of the early names of the variety (*P. deflexa*). Leaves mostly larger, and with their branchlets usually glaucous, the latter when bruised giving off a fragrance resembling oil of orange. Male flowers shorter, one to one and one-half inches, but thicker and yellowish. Botanists claim four varieties of this species.

First—Pinus Jeffreyi or *Black Pine*. This tree inhabits the high valleys, twenty to fifty miles to the North and West of Mount Shasta. It grows at an elevation from 6,000 to 9,000 feet, on such formations of the mountain ranges as were first laid bare after the glacial epoch; therefore, the oldest of the broken-coned pines, and perhaps the common parent of all the other forms, including those of the Yellow Pine described. This tree is quite large, from four to six feet in diameter, and about 200 feet in height. It usually presents a large, broad, dome-shaped crown in contour, with few long, usually drooping limbs; bark dark brown, thick with large checks; sap-wood thick, the heart-wood not determined.

Trees of this form are sparsely met with in other localities of the Sierra, always at high elevations. They are at once detected by their strange habitat, which is above the limit of the Yellow Pine in the contiguous forests below, and by the long, drooping limbs, and the large, many-scaled, longer cones than others of the group.

Interesting trees of this description are met with on the flanks of Mounts Shasta and Lassen, the numerous peaks of the Northern Sierra, especially near Lakes Tahoe and Webber.

The *second* form (*a*), variety *nigrans*, or Black-bark Pine. This form comprises the dark-barked, long-coned section of the broken-coned

Pines, that occupy lower altitudes in the same regions as the other forms. Trees of medium size, 120 to 150 feet high, flourishing near the banks of streams, long retaining their body-limbs, and hence forming symmetrical spire-shaped outlines. Bark black, hard, thick, and rather coarsely checked. Sap-wood very thick; heart-wood consequently meager, usually very resinous.

The *third* form (*b*), variety *deflexa*, is the Red-bark Pine. This form constitutes the principal timber tree of the higher Truckee region, and similar localities North and South of that noted lumber station. These trees are of the largest size, tall and free from body limbs. Bark thick, reddish-brown, hard, coarsely checked; sap-wood not thick; heart-wood of the best quality. Two styles of cones are noted on these trees: one series of yearling cones are apple-green, large, narrowly ovate, one-halt to one inch long, becoming at maturity widely open, and three to five inches thick at the base, which is truncated. The other series of cones are of a beautiful purple when a year old, and about an inch long, on short peduncles. When mature they are long ovate, four to eight inches in length; when fallen, truncate at the base, and broadly oval by the expansion of the scales. Leaves longer and stronger than the neighboring Yellow Pine, and white glaucous, especially when young.

The *fourth* form (*c*), variety *peninsularis*—Peninsula Pine. This tree is found only on the mountains of the Peninsula of Lower California, at an elevation of about 4,000 feet, and forms an extensive forest upon a substratum of crumbling, white sand-rocks. Trees of medium size, 150 to 200 feet in height, with full spire-form, or more rounded outlines. Bark grayish or drab, thick, hard, deeply fissured. Sap-wood not thick, heart-wood undetermined.

The Peninsula Pine, when standing alone, presents a dome-shaped form with drooping limbs. Yearling cones very large, one to one and one-half inches long, elliptical, and purple in color. Mature cones abundant, many years' crops lying under the trees, all large, broadly ovate, six to eight inches long, truncate at the base, mahogany-colored, with prickles strongly reflexed.

GROUP 5. HEAVY SPINE-CONED, LONG-LIMBED PINES.—(P. *Coulteri*, *Sabiniana* and *Torreyana*.)—These trees present the ponderous, massive and coarse, also the protecting principle of the multifarious Pine family. Inhabiting hot, scorched regions, contending there with dwarfed oaks and "chapparal;" these trees are never slim and feeble, but rather broadened out and freely branching, ever holding aloft their enormous clusters of fruit. The exceeding massiveness of the cones of these species is noted, and it is claimed with much plausibility that the thick, strong and hard investment of carpellary scales defends the ovules from intense heat, better than a light one could; and it is also claimed that these scales are a defense against the attacks of insects that infest and render abortive the

seed crops of soft-scaled Pines and Spruces, and the enormous hooks of their cones operate as a barrier to the predatory habits of nut-hunting squirrels.

The cones of this group of Pines are lateral (arising along the bearing shoots at some distance from the apex), verticillate, or clustered and declined, mostly not falling at maturity, but persisting, and either becoming inclosed by the later layers of wood, or the peduncle is stretched and at length broken by the enlargement of the tree, and the cone is carried outward, confined in the bark.

No. 13. *Pinus Coulteri.*—BIG-CONE PINE, COULTER'S PINE.—Trees usually larger than those of the next species, with dark-green, abundant foliage, found in a few cañons, and other sunny localities of the interior Coast Mountains, from Mt. Diablo to Santa Inez and San Bernardino. Leaves, the largest known, eight to fourteen inches long, and three-quarters of an inch wide. Yearling cones one to two inches long, with shorter appressed scales. Mature cones elongated, elliptical, of matchless size and weight, fifteen to twenty inches in length, half as thick and weighing five to eight pounds! The large scales, more gradually tapering than the other into the large, unexampled, incurved hooks, which, on the upper (outer) side, near the base, are one and one-half to three and one-half inches in length. The seeds are quite unexpectedly smaller, about one-half an inch long, and one-half as wide, but with large broad wings, one and one-half inches long.

This species of California Pines was first discovered and described by Dr. T. Coulter, in 1831, while on his way from Mexico to the Northern part of California (then "Alta California"). Noting the arrangement and elevation of the different ranges of the Coast Mountains in this part of the State (about the locality of the present town of San Luis Obispo), he climbed the Santa Lucia Range and found crowning its peaks a species of Pine, the like of which was never seen before. Tall, branching trees were loaded with monstrous and heavy cones of several pounds' weight, most of them still attached to the trees, all armed with huge, hooked spines, while the large leaves were half as long as his arm! This group of trees comprises a forest of some considerable extent, being several miles long, irregularly distributed over the flanks of the peaks. The largest of the trees are one hundred and twenty to one hundred and fifty feet high, three to five in diameter, and with dark, deeply-fissured bark. The leaves are the largest of any in the whole Pine family. The male flowers grow in tufts near the ends of the branchlets, of a light cream color, the spikes ovate oblong (one inch). The cones generally singly, but often in pairs, or rarely in threes, hang in an inclined position from the limbs, their shining, spine-covered proportions half protruding beyond the long leaves, often a foot. This Pine is found at altitudes of 1,500 to 7,000 feet.

No. 14. *Pinus Sabiniana*—GRAY LEAF PINE, SABINE'S PINE.—Trees of the hot interior foot-hills, with divided or branching habit, and usually light grayish, glaucous foliage, which is generally scant, mostly gathered at the ends of the leading upper shoots, the other branchlets poorly provided with few, weak, at length drooping leaves. Yearling cones globular, an inch long, with long, spreading, hook-like scales. Mature cones heavy—two to five pounds, broadly ovate, four to ten inches in length, the stout hooks abruptly tapering to the point, one to three inches long, the longest being at the base on the outer (upper) side. Seeds very large, sub-cylindric, one-half to three fourths of an inch long, jet black, with a very thick, hard shell, and a truly delicious kernel, formerly much used for food by Indians, giving this tree the name of "Digger Pine" (from the "Digger tribe" of Indians). Wings very short, the thick base one-fourth enveloping the seed with its broad rim.

This species of Pine was discovered by David Douglass, in 1830, in the region back of Monterey Bay, and named by him in honor of his early friend and patron, Joseph Sabine. It is the "Nut-Pine" of the foot-hills, and is found on the lower slopes of both the Coast Range and the Sierra Nevada, occupying the drier positions. Leaves from four to ten inches long, growing in threes. The woodpecker selects these trees as storehouses for its winter food, cutting holes in the bark and putting an acorn in each.

This tree was noted early for its divided or long-branching habit, its sparse foliage, and its light-greenish color, and also the great change of appearance undergone by the cone, which is during the first year rounded and bright-green, and when perfected the following November, elongated and brown.

The Northern forms of this species are usually marked by thinner foliage and less strongly-hooked cones than Southern ones. In the Sierra foot-hills, near Auburn, the leaves are very few and light-colored, while the tree is often attacked at every stage of its growth by parasites, the most deadly of which is the "pine-girdler," a certain species of fungus, which attacks trees of all ages, but especially young ones, forming swellings or rings on the limbs. Often nearly every tree of a grove will be diseased, and dead ones are seen on every hand. These fungi have been described and named as *Dædalia vorax*.

In Southern sections, notably in the southern end of Sabine's Valley, this pine is much less attacked by parasites, and the trees usually display heavier, but still light and airy foliage, produced principally at the ends of the upright branchlets. On the Tehachapi Mountains the trees are quite dark-green, with abundance of foliage, large cones with strong hooks. The "Gray-leaf Pine," on account of its divided or freely-branching habit, often resembles a willow more than a Pine, while its light, almost pea-green foliage, at a distance, resembles strongly clouds of smoke.

No. 15. *Pinus Torreyana*—TORREY'S PINE, LONE PINE.—This species presents but few small trees, peculiar to the sea-coast in the Southern part of the State. Leaves in groups of five, very large and long, eight to twelve inches. Male flowers yellowish, the largest known; one and one-half to two inches long, and one-quarter to three-eighths of an inch thick, scales fourteen. Yearling cones globular, one-half of an inch long, on peduncles of one-half of an inch. Mature cones broadly ovate, four to six inches long and very heavy, one to two pounds, with broad, thick scales, armed with short, quadrangular, pyramidal, obtusely-pointed prickles. Seeds very large, ovate, sub-cylindrical, one-half to three-fourths of an inch in length, the shell being very thick and hard, the kernel edible; wings short, very thick at base and enclosing the seed. Cones persisting until the fourth season, and retaining the lower portion of their seeds, although opened the second autumn preceding.

A singular, very limited and perhaps expiring species, over fifty miles from any others of the Pine family. The trees bear well when quite young, about fifteen years. The third year of bearing, the cones open and discharge most of their seeds, and the fourth season, they usually fall with the remaining seeds held in the lower fully developed scales, leaving a few of the still lower undeveloped scales on the branchlet. As the visitor, for the first time, views this curious Pine, he is struck by the persistence of its character, and the suggestion naturally occurs, that this is the species of Pine from which most might be expected by planting it along the now mostly denuded foot-hills of the Coast Range of mountains.

GROUP 6. LONG CLOSED-CONE, SLENDER PINES—(*P. insignis*, *P. tuberculata*).—Cones in verticils or clusters of two to seven, often more than one set on the same year's shoot; usually strongly declined, hard, heavy, oblique and gibbous, on account of the outer scales near the base bearing strong knobs or tubercles, but unexpectedly, these not perfecting their seeds; the rest of the scales flat, or nearly so, and bearing the perfect seed. The cones are usually long persistent, confined in the bark, and *serotinous*, *i. e.*, they remain long closed, retaining the small, rough or tuberculated seeds, with their vitality unimpaired for an indefinite number of years. Leaves of medium size, three to six inches in length. Male flowers very small, on branchlets, with leaves above them. Scales six to ten. Small trees mostly crowded into dense groves, tall and slender, but broad-crowned or rounded, if unrestrained.

No. 16. *Pinus insignis*—MONTEREY PINE.—Beautiful trees of medium size, extremely local, with headquarters at Point Pinos, on Monterey Bay, and extending along near the ocean from Pescadero to San Simeon Bay. Leaves in threes, rather slender, bright green. Yearling cones an inch long, early gibbous with the enlarged scales. Mature cones ovate-conical, three to five inches long, tubercles at base outside, large, hemispherical: prickles very small, deciduous. Seeds pale, strongly reticu-

lated with brown; wings an inch long, beautifully veined with reddish brown. Bark thick, fissured, very hard, black without, bright red on the inner face. Very interesting trees, freely growing upon the but recently-moving light sand dunes of the sea. Readily yielding to cultivation, and very fast-growing, annual layers often seen one-half to one inch in thickness.

This tree was discovered and named by Douglass in 1830, and is seen in perfection on Point Pinos (Pacific Grove), Monterey Bay. It covers many thousand acres in the vicinity of Monterey and Carmelo, forming quite a forest along the coast between these places. It grows sixty to one hundred feet high, one to three feet in diameter; shape very irregular, often only a few rigid, much-spreading branches; foliage dense, and of a bright-green color. Cones persistent, ten to nineteen whorls. This tree makes an excellent quality of lumber, and is much used for building purposes.

No. 17. *Pinus tuberculata*—KNOB-CONE PINE, SUN-LOVING PINE.—Usually small, early-bearing, crowded, slender trees, rarely found on dry, sunny slopes of the inner Coast Range, and the Western and Northern hills of the Sierra, where it often attains the height of forty to eighty feet. with a diameter of two to three feet. Yearling cones reddish, three-fourths of an inch long, elliptical, with short, appressed scales. Mature cones long-conical, pointed, three to seven inches long (shorter, and with shorter tubercles, in the Shasta region), leather-brown at maturity, becoming gray with age, spreading or strongly declined, usually in full verticils, but little removed from each other, and persistent on the stems and branches from bottom to top until the destruction of the tree by fire, when the cone-scales open with a loud report, setting free the long-pent, transparent-winged seeds, to be carried away by the wind and, perhaps, reforest the region.

These trees attract the attention of the tourists approaching the capital city of the State by way of the C. P. R. R., through the passes of the Sierra, and as has aptly been said, "they are long frettings or fringes of small, slender, close-set Pines, decorating with light-green banners the copings of the rounded mountains, especially on the east side of the upper Sacramento River, and extending from the locality of the present town of Redding to the intermediate slopes of Shasta. These long fringes, and in places more compact patches of trees, compose the head-quarters of the curious Knob-cone Pine, associated in places with Yellow Pine, Gray-leaf and Sugar Pine, but always to be distinguished from them at sight, on accouut of small size when coming into bearing, as well as by its peculiar sun-exposed positions."

In favored situations the Knob-cone pine forms quite extensive and exclusive forest areas, swarming so thickly upon the locality as to render them slim and tall, sometimes no larger than a walking-stick, but even

then closely and regularly studded from base to apex with whorls of long, narrow, curved, strongly-declined, leather-brown cones. The striking peculiarity of this pine is the presence of all its yearly crops of cones, the oldest gray and weather-worn, the youngest shining with yellowish-green luster. They seem seldom or never to fall away or open at maturity naturally, yet they are sometimes met with the scales of the cones turned stiffly backward, releasing the seeds. It is found that the seeds in the long-closed cones are always in good vital condition, and Dr. Engelmann writes that "Seeds of closed cones two to eight years old when I collected them, and then kept four years in a hot garret, germinated freely with Professor Sargent, of the Arnold Arboretum at Cambridge, Massachusetts."

No. 18. *Pinus muricata*—PRICKLE-CONE PINE, SWAMP PINE.—Small, slender trees, rare, in few swampy localities of the outer Coast range, from San Luis Obispo and Point Pinos to Cape Mendocino. Leaves in pairs, but unlike most other binate leaves; very long—three to six inches. Yearling cones globular, one-half an inch long, with pointed, spreading scales. Mature cones nearly sessile, spreading or recurved, in verticils or clusters of two to five, often of six to seven; ovate, and slightly gibbous, tubercles longest on the basal upper side, conical, long, incurved, one-fourth to one-half an inch long, all sharp and persistent. Seeds very small, black, with delicate wings. Timber, under some conditions, said to be hard and tough. The cones have been known to persist two to thirty years, and then release good seeds.

This variety of the Pine family is found on the western slope of the Coast Range of Mountains, rarely over ten miles distant from the sea. It is noted for its low, wet, marsh-loving habit, its small egg-shaped cones, with permanent prickles, and its leaves always in pairs. Its long-persistent and long-closed fruit is released only upon the most favorable conditions for propagation. The tree is well distributed along the Coast, on favorable stations, ready to press in upon unoccupied ground; and though the destruction of the forests of the Sierra and Coast Ranges seems imminent (from fires, wood-choppers, etc.), this species and its congeners may be regarded with confidence as the group destined to reclothe our mountain sides with noble forests.

Mr. Wenzell read a paper on the red coloring principle of pelargonium flowers:

A CONTRIBUTION TO THE KNOWLEDGE OF THE COLORING PRINCIPLES OF FLOWERS.

BY W. T. WENZELL, SAN FRANCISCO, CAL.

Amongst the principles of plants exist substances which are characterized by possessing particular colors, and such that may under certain conditions or influences be changed from a colorless state to one exhibit-

ing the phenomenon of color. The former are usually denominated pigments, the latter chromogenes. Some of these belong properly to the acids, others are decidedly glucosidic in character; whilst others, of the nature of which but little is known, might probably be placed into another class.

If many of the coloring principles do not assume a pronounced acid character, they are yet capable of uniting with certain bases, such as oxide of zinc, oxide of lead, alumina and other metallic oxides. The great evanescence of these coloring matters is well known: many of them are readily bleached on exposure to air, moisture and sunlight. Chlorine and sulphurous acid are the most energetic of all bleaching agents. The former acts either directly by removing a portion of the hydrogen of the coloring matter, or indirectly by oxidation in the presence of water, either case causing the destruction of color. The latter acts either by reduction, or the formation of a colorless combination with the coloring principle. In the latter case the addition of a stronger acid will decompose the colorless compound and liberate the coloring principle and thus restore the original color. The complete destruction of all coloring matters is accomplished by nitric acid.

Of all vegetable colors, those which are the most brilliant, vying in beauty with the colors of the rainbow and the solar spectrum, are found in the floral leaves. Behrens tells us, that these coloring substances are much less perfectly known than chlorophyll and its related principles. These chromogenes exist, according to Behrens, as a part of the cell contents, either dissolved in the cell-sap, or they are united with variously formed granular structures. When in a dissolved state they are supposed to constitute chiefly the blue, violet, rose, and their modifications; and when mixed with granules they are deemed to constitute the colors yellow, red and green, with notable exceptions in both cases.

Marquart in 1835 separated a coloring substance from blue, red and violet flowers, which he named *anthocyan*. He asserted that this blue coloring matter was in combination with an acid to constitute the red, and that the violet was the product of its combination with a weaker acid, probably carbonic. He prepared his anthocyan by evaporating a hydro-alcoholic tincture of the floral petals made in the cold (the tincture is generally nearly colorless), careful as to dryness, treated the residue with water, filtered, and evaporated the filtrate. The anthocyan remained as a blue hygroscopic mass, which was soluble in water and dilute alcohol, but insoluble in absolute alcohol and in ether. Its solution in water when first made is blue, which, however, rapidly disappears. Anthocyan is colored red by acids and green by alkalies.

Fremy and Cloëz call the blue coloring matter contained in violets, the blue bottle (Centaurea cyanus), and other blue flowers, *cyanin*. They obtained it by extracting it from flowers with boiling alcohol, dissolving the

residue from the evaporated tincture in water, precipitating the blue solution with acetate of lead, and decomposing the green precipitate with hydrogen sulphide. The filtrate was evaporated, extracted with absolute alcohol, and the alcoholic solution mixed with ether to precipitate the coloring principle. Cyanin separated as a bluish flocculent precipitate, soluble in water and in alcohol, and insoluble in ether. It is reddened by acids and turned green by alkalies. Evidently this substance is identical with that previously obtained by Marquart, only that this coloring principle is much the purer. These chemists also regarded the coloring matter of roses, dahlias, peonies, etc.. as cyanin reddened by acids, and on the other hand they believed scarlet red flowers to contain a mixture of xanthin or xanthein with cyanin.

According to Filhol, both the red and the blue flowers contain two coloring principles, of which the one is colorless in acid solutions and yellow in alkaline solutions, the other being colored red by acids and blue by alkalies.

That some of the coloring principles, for instance the red, may be changed by alkalies to blue and green, and the blue to red by the acids, has been demonstrated by the writer in many instances, and more particularly in the petals of the horse-shoe geranium ; but there are again others, which do not behave in a similar manner. The flower of the crimson dahlia for instance readily gives up its chromogen to either strong or diluted alcohol, the leaflets lose their color, and the yellow tincture obtained did not change color on the addition of an acid, but on adding ammonia the original red color was reproduced. On preparing a similar tincture from the yellow dahlia, this was also yellow, acids caused no change, but ammonia changed the yellow to red. Whilst most of the floral leaves give up their coloring matters to diluted alcohol (equal volumes of alcohol and water), the yellow coloring principle contained in the florets of the marigold (Calendula officinalis) and the purple of the flowers of the four-o'clock (Mirabilis Jalapa) are not dissolved in dilute alcohol, stronger alcohol being required. These, in opposition to the nearly colorless tinctures obtained from other flowers, are strongly tinged with their respective coloring principles, and these colors are not materially changed on rendering the tinctures either acid or alkaline. It seems from these few examples, selected at random, that all coloring principles of flowers cannot be classified under the two heads of anthocyan and xanthin. Whilst the yellow coloring principle of the calendula is probably related to xanthin, on the other hand we shall see that in the yellow dahlia it is quite as different on account of the facility with which it changed into the color of the red dahlia.

In order to study the nature of the coloring matters of flowers and to either prove or disprove the broad assertion of Fremy and Cloëz, that scarlet-red flowers were colored by mixtures of cyanin and xanthin, the

author subjected the floral leaflets or petals of the scarlet variety of horse-shoe geranium to a chemical and spectroscopical research. This flower, belonging to the natural order of Geraniaceæ, commonly known as the horse-shoe geranium, is a plant characterized by the feature that its leaves are always marked with a dark concentric stripe or zone of various colors, hence its botanical name, Pelargonium zonale. Happily the selection fell to an individual belonging to an immense genus embracing numerous species and varieties with endless differences of shades of color. It remained for this particular flower to prove that the conception of two homogeneous coloring principles, to which all the observed shades and hues of colors in flowers could be referred, was simply a fallacy. It would seem probable that yellow and orange present the simplest type of the coloring principles of flowers, a supposition fully in accord with their greater resistance to change by cultivation and chemical influences. On the other hand we shall find that those brilliant colors manifested in the blues, purples, and reds, are capable of assuming under cultivation and hybridization endless varieties of hues and tints, so extremely sensitive to external influences that we cannot but believe that these colors represent the highest types of development, and are frequently composed, as will be shown, of a number of distinct coloring principles.

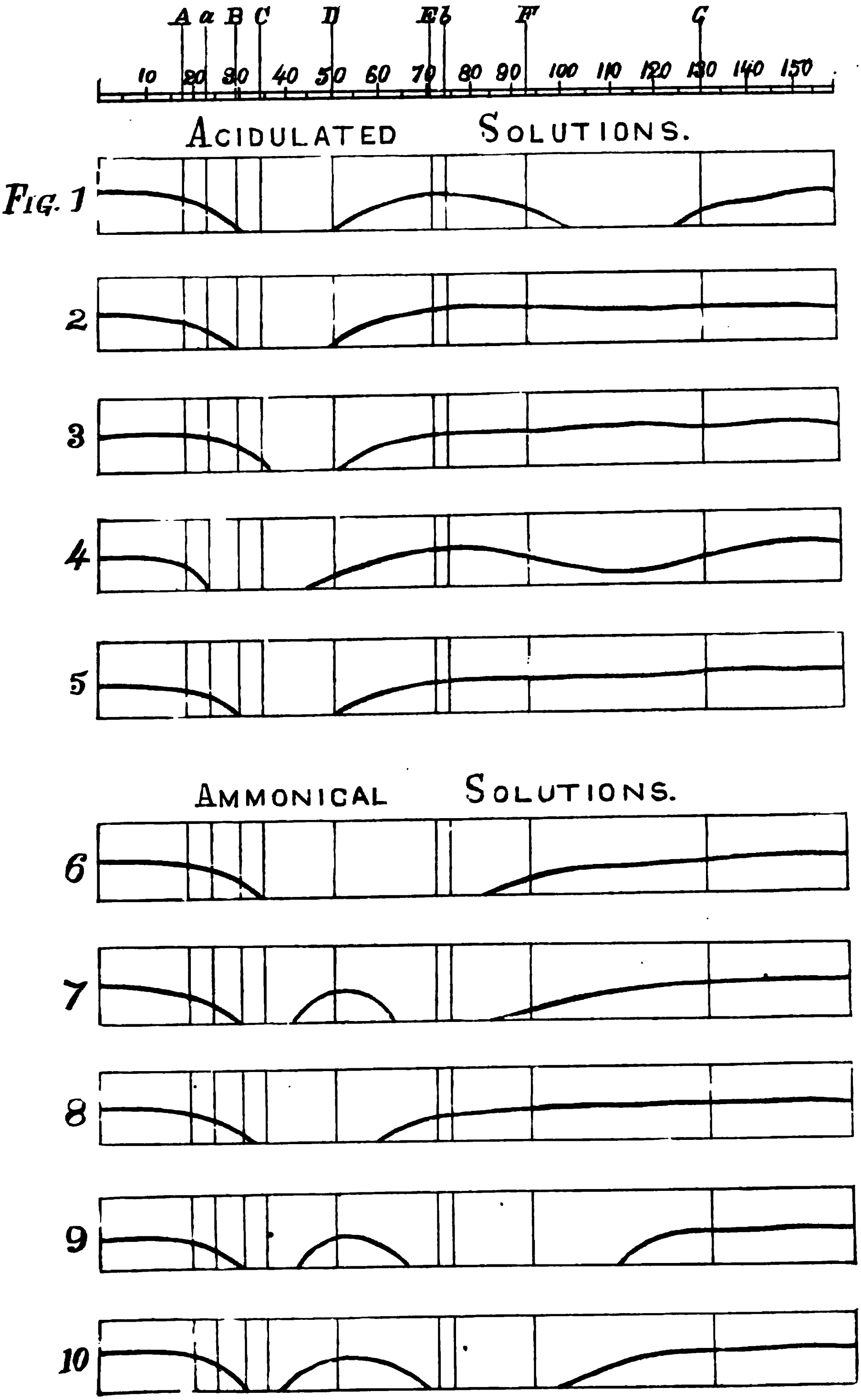
The following is an outline of the course of investigation: Two and one-half ounces of the fresh floral leaves of the scarlet horse-shoe geranium were covered with stronger alcohol, and macerated two days. The tincture thus obtained was allowed to drain from the leaves, an additional 4 oz. of the alcohol added and allowed to stand 24 hours. This tincture was expressed, mixed with the tincture first obtained, and filtered. The filtrate was next treated with acetate of lead as long as a precipitate was obtained, the *blue* precipitate collected on a filter and washed with dilute alcohol until the washing ceased to indicate sugar with Fehling's solution. The washing was then continued with stronger alcohol to remove a waxy substance, the covering of the floral leaves. The washed precipitate was then suspended in dilute alcohol, decomposed by dilute sulphuric acid, and filtered from the lead sulphate. The solution obtained, which possessed a beautiful crimson color, was then treated with American isinglass to remove the tannic acid which it also contained. This solution was examined spectroscopically with the following results: An absorption of a portion of the yellow rays, together with the entire absorption of the green, and the extreme end of the spectrum including violet and purple, as shown in the chart and marked Fig. 1. When this solution is rendered alkaline with ammonia, it changes from the crimson to an ordinary red. Its spectrum, as shown in Fig. 6, demonstrates the absorption of all the colorific rays, beginning at the D line to the extreme end. This ammoniacal solution exhibits also a green fluorescence, and the red color when viewed by transmitted and green by reflected light.

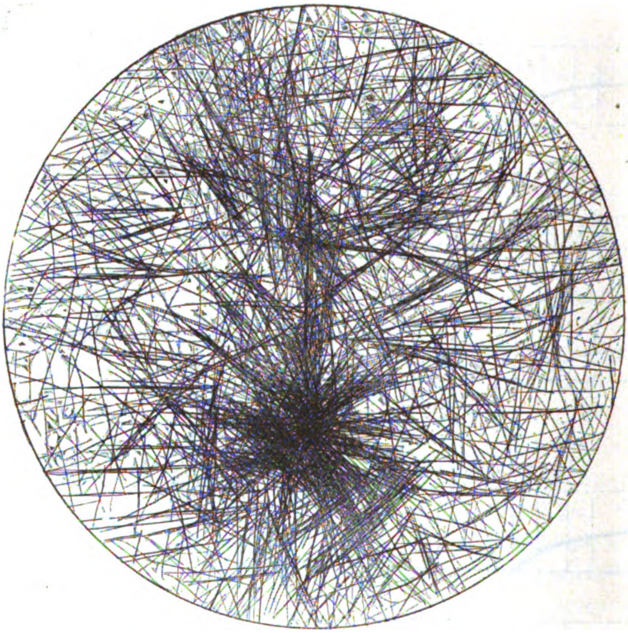
The filtrate obtained from the acetate of lead precipitate was carefully neutralized with ammonia, and then liquor plumbi subacetatis added as long as a precipitate was obtained. The *green* precipitate was collected on a filter and washed with dilute alcohol until seven fluid ounces of liquid was obtained. Then the washing was continued, until Fehling's test gave no indications of sugar. This precipitate was suspended in dilute alcohol and decomposed with sulphuric acid. The red solution thus obtained was allowed to stand over night, when on examination a crop of red crystals was found to have separated, which were collected on a filter. The filtered liquid from the crystals exhibited, unlike that obtained from the acetate of lead precipitate, a red color free from a carmine tint. The spectrum of this solution is shown in Fig. 2, and shows a complete absorption, beginning at the D line, corresponding to the green, blue, violet and purple rays. Its ammoniacal solution gave a brownish fluorescence and a purplish-violet color, when viewed by transmitted light, and a bluish-green by reflected, as shown in Fig. 7.

After the action of solution of basic acetate of lead, the filtrate from it was made alkaline with ammonia, and regardless of the turbidity produced, a solution of plumbic subacetate made alkaline with ammonia was added, when an *ochre-yellow* precipitate separated, which was washed with dilute alcohol made alkaline with ammonia, and decomposed in the same manner as the two previous, precipitated with diluted sulphuric acid, and filtered. This solution after standing deposited a larger quantity of the red crystals than were obtained from the subacetate of lead, and a microscopical examination showed their identity. The red solution drained from these crystals showed the spectrum shown in Fig. 3, the absorption of the extreme left encroaching upon the red beyond the C line, whilst the absorption of yellow rays commenced at a short distance beyond the D line, continuing to the extreme end of the spectrum. Its ammoniacal solution possessed a beautiful red color when viewed by transmitted light, and a wine color by reflected light. It exhibited no fluorescence. Its spectrum did not differ materially from that of the acid solution. The only difference is shown by the fact that according to Fig. 8, there is but a small absorption of the red, and none of the yellow rays.

After thus exhausting the petals with the dilute alcohol as described, they had nearly lost their color, retaining only a slight pink tint. They were then macerated several weeks with alcohol strongly acidulated with sulphuric acid. This alcoholic tincture had acquired a deep red color, and when subjected to spectrum analysis gave the spectrum represented in Fig. 4. The absorption to the right commenced at the orange, increasing gradually in intensity to the E line, then again decreasing from the F line to a minimum about the middle of the F and G lines, and from thence increasing gradually again to the end of the spectrum. The spectrum of its ammoniacal solution is shown in Fig. 9. It shows an absorp-

SPECTRA OF THE COLORING PRINCIPLES OF PELARGONIUM ZONALE.





CRYSTALS OF COLORING MATTER OF PELARGONIUM *ZONALE.*

tion band at D, showing the extinction of the orange and yellow rays and also the absorption of the blue, violet, and purple, commencing at a point midway between the lines F and G. The color of this solution when viewed by transmitted light is a light purple, by reflected light a blue. Its fluorescence exhibits a lavender tint.

The crystals obtained from the subacetate of lead and ammoniacal subacetate of lead precipitates as stated, presented long, red, needle-shaped, semi-opaque, microscopic crystals. They are very soluble in water, sparingly soluble in glacial acetic acid, more soluble in the hot acid. The solution in glacial acetic acid leaves on evaporation a violet colored residue which does not show any crystalline structure. The crystals are insoluble in alcohol, ether, benzene, petroleum ether, chloroform, acetic ether, and amylic alcohol. The aqueous solution presents a deep orange color, which, when mixed with three volumes of alcohol, acquires a rich carmine tint. This alcoholic solution when made alkaline with ammonia assumed a green color, which was again restored to its original carmine tint on acidulating with sulphuric acid.

If to this alcoholic solution of the red crystals the ammonia is again added very carefully, avoiding excess, a blue color is first produced; and when sulphuric acid is now added to produce the carmine color, the subsequent gradual addition of ammonia will cause no green coloration, but the solution will pass through a chromatic scale of purple, violet, and blue. It is of importance to consider that the solutions of these crystals treated with ammonia, and thereby giving rise to these different colorific effects of purple, violet, blue and green, are characterized by spectra showing a similarity of phenomena of their absorption. They all have an absorption band in common, situated as shown in Fig. 10 between the C and E lines, showing the complete extinction of the orange and yellow rays, the spectra of the green and blue solutions being identical, and in the purple the position of the band is the same, with the only difference that the band is narrower, the red portion encroaching upon it. The spectrum of the alcoholic acidulated solution shown in Fig. 5 does not differ materially from that of Fig. 2.

The ammoniacal solution of the red crystals exhibits when viewed by transmitted light a red color, and by reflected light a green. Its fluorescence is red. The crystals are easily purified by dissolving in hot dilute alcohol, when after cooling and about 12 hours' repose they will separate in their characteristic form. As the crystals do not yield anthraquinon when heated with zinc dust, and when subjected to sublimation do not yield pyrocatechin, they evidently are not members of the aromatic combinations, or do not contain the benzine ring.

In conclusion the author would direct attention to the fact of this paper announcing the discovery of a crystalline coloring matter in flowers, and the presence of five distinct coloring principles in the petals of the scarlet

variety of Pelargonium zonale; and that other varieties are likely to be more simple in color constitution. Thus the crimson Pelargonium zonale contains only two chromogenes, giving respectively the spectra Fig. 1 and Fig. 3; the others, together with the crystalline principle, being absent.

MR. WENZELL.—I would mention that this is the first instance where a crystalline coloring body has been separated from floral leaves, and that the coloring principles of flowers are composite in their character, and that the different tints in these flowers depend upon the different coloring principles. (The speaker exhibited various colored flowers.) This is a geranium, or rather pelargonium, of which I have investigated the floral leaves, commonly called scarlet or horse-shoe geranium, and this shows the leaves. It has a brownish ring there, to which the name zonale refers. The others are varieties of the same Pelargonium zonale. This crimson pelargonium I have also made a subject of investigation, and find that it contains only two coloring matters—the coloring matters designated in the paper as Nos. 2 and 3. The first is wanting, and also the crystals. This pelargonium does not contain the crystalline substance. Here is another variety of the same kind. I have not investigated this. I merely show it as a sample of the many different colors that may occur in these flowers.

I hope that the subject is not only interesting in its scientific point of view, but also in its physical characteristics, namely, the coloring of the flowers. I don't think there is anything more beautiful than the color of flowers.

MR. BEDFORD.—Mr. Chairman, I have listened to this paper with a good deal of interest. It betokens a great amount of research. I think it is a paper that will please all who are interested scientifically or otherwise in nature's products, the flowers. I rise to offer this motion, that the paper be received and referred for publication, and that we tender to Mr. Wenzell our thanks for this very able paper now presented.

The motion was duly seconded and adopted.

MR. WENZELL.—I am much obliged to the gentlemen for their kindness in acknowledging the worth of the paper, although I don't consider that it is complete by any means; it is only the beginning of work in that direction. It is true, I have separated the substance in the crystalline form, which we can analyze and determine its ultimate constitution. But we do not know what the other coloring matters are, and it must require a great deal of labor to determine that.

The following paper, read by Mr. Hallberg, was accepted and referred:

ON BITTER WATERS.

BY ENNO SANDER, PH. D., ST. LOUIS.

On a cold day last winter I observed in my laboratory a considerable deposit in a bottle containing a 10 per cent. solution of sodium sulphate, while a bottle of "Rubinat Condal" next to it had retained its limpidity, although, according to the analysis on its label, it contains 9.323 per cent. sodium sulphate, and so much of other salts as to increase its solid ingredients to a fraction over 10 per cent. Thinking that an accidental disturbance of the sodium sulphate bottle might have caused the deposition of the crystals, I tried to produce the same effect in the rubinat by

shaking it, but could not change its appearance in the slightest degree. After the determination of its specific gravity (which amounted to but 1.038, and indicated a solution of anhydrous sodium sulphate of only 4.3 per cent.), I came to the conclusion that this and other waters might need an examination, which was given, and I now offer the result of my investigations of some bitter waters in this paper.

The name "bitter water" has been adopted from the German, and is given to those strongly purgative waters which are impregnated with a large quantity of solid ingredients, composed more especially of alkaline and earthy sulphates. The latter are accompanied occasionally by alkaline chlorides, but seldom by carbonic salts and free carbon dioxide. The presence of hydrogen sulphide is generally caused by a reduction of their sulphuric salts in contact with organic matter, which latter is either an original part of the composition of the water, or an accidental addition to the contents of the bottle, caused by careless cleansing. The coexistence of calcium and magnesium sulphate in these waters led Mitscherlich to attribute their presence to a double decomposition of calcium sulphate and magnesium carbonate, while others explain it by the action of decomposing pyrites upon talcose slates or other silicates containing magnesium. Thus have been formed in various places layers of salty crystalline masses, and not long ago I received from the northern part of Arkansas an amorphous mass of salty appearance and bitter taste, which, after being dissolved in hot water and filtered, yielded from the first crystallization a considerable quantity of pure magnesium sulphate. It was accompanied by gypsum, iron, and silica, and no doubt strong bitter water could have been obtained there, if it had been dug for.

Bitter waters also frequently occur in beds of marl, which have been formed by the decomposition of rocks containing the elements necessary for the production of these waters, through the agency of atmospheric precipitations, which, penetrating into the soil, absorb its soluble substances. Such waters are consequently dependent upon atmospheric influences, and demonstrate it by the inconstancy of both their ingredients and their temperature. To this special class belong those waters procured from wells sunk into the ground, as, for instance, those near Buda-Pesth and in the northern part of Bohemia.

Bitter waters are limpid and devoid of color, the latter rarely reaching a pale amber. Their salty, bitter taste sticks to the tongue, and makes them very disagreeable and nauseous to the taste—qualities intensified by the absence of carbon dioxide.

There are many bitter springs and wells mentioned in the "Mineral Springs of the United States" (Bulletin of the United States Geological Survey by A. C. Peale, M. D.), but the composition, especially of those containing a minimum of from 50 to 100 grains of sulphate salts, is known of but a comparatively small number. They are distributed all over the

country, but the fame of few has reached beyond their own neighborhoods, and as far as my knowledge goes, none are used commercially like those European purgative waters so highly recommended by our secular and professional press.

The "Rubinat Condal," a Spanish purgative water, referred to in the outset of this paper, claims 100.56 parts of solid ingredients in 1,000 parts of water, almost all of which are sulphates, and with this array of figures proclaims that "this water is superior to any other water of the same kind in Spain or Europe."

It has long been the universal custom among chemists to calculate, in their anhydrous state, the solid ingredients or saline contents of any substance of which an analysis is made; and when for any season this rule is violated and the crystalline form of a salt is reported, to mention the exact combination of the salt and water which go to make up the crystals so reported—a proceeding rendered necessary by the fact that some salts combine with varying equivalents of water, according to their different forms of crystallization. It must, therefore, be surmised that Dr. Canudas, of Salada, knew of this established custom when he rendered his report of the analysis of Rubinat Condal, and that every physician, pharmacist, and chemist—in short, everybody who is acquainted with the rules of chemical analysis—has presumed that the sodium sulphate and magnesium sulphate, both ingredients of the Rubinat Condal, were calculated in this analysis as anhydrous salts.

As mentioned before, the specific gravity of Rubinat Condal is 1.038, but, as its analysis claims over 10 per cent. of solid contents (of which 9.64 consist of magnesium and sodium sulphates), its specific gravity ought to approximate that of a 10 per cent. solution of anhydrous sodium sulphate, or 1.092 (Storer's Dictionary of Solubilities, page 627). A specific gravity of 1.038 corresponds to a solution containing 4.3 per cent. of sodium sulphate, and to 9.75 per cent. of Glauber's salts (ibid.), and the evaporation of 100 cubic centimetres of Rubinat, which were taken from the bottle at a temperature of 60° F., yielded a residue of 4.531 grains of solid ingredients ,which corresponds almost precisely with the formula of the analysis, provided the water of crystallization be deducted from the figures expressing the quantities of the sulphate of sodium, magnesium and calcium. The determination of the sulphuric acid confirmed this statement. Whether this water comes from a spring or a well, or is simply a filtered and bottled solution of a crude Glauber's salt, I have not been able to ascertain.

The "natural bitter water of Friedrichshall" is obtained from a spring in Germany, which was known and used for manufacturing common salt as early as the twelfth century, and for Epsom and Glauber's salts since the last century. It occurs in a bed of marl formed with sandstone, gypsum and dolomite, belonging to the Keuper system. In former

years a bitter water was bottled at the spring, which was produced by mixing the water from the old, weaker spring with that of a new and stronger artesian well, in such proportion as to give it a specific gravity of 1.022, and it was introduced by Dr. Bartenstein in 1842. The analysis of Justus von Liebig, in 1847, by whom it was strongly recommended, increased its popularity, although it had to share it with the Kissingen bitter water, the production of which in almost identical proportions was also recommended by Liebig. They both contain 25.294 parts of solid ingredients in 1,000 parts of water (Dr. O. Dirufsen, in *Balneotherapie*, 1876, page 144–146).

A stronger water than this must have been bottled previous to 1885, for the analysis of a sample taken from J. F. Heyl & Co., in Berlin, at that time showed 35.938 parts, while the water taken from the artesian well personally by Professor Dr. Oscar Liebreich, in 1885, is the strongest, and contains 61.396 parts of solids in 1,000 parts of water (*Zeitschrift für Mineral-wasser-Fabrication*, January, 1886, page 249). Since that time this strength has been kept up. I have obtained a similar sum total from my evaporations with a specific gravity of 1.042.

The marl beds of northern Bohemia consist of decomposed basalt and clingstone, gypsum, and carbonate of lime. Near the villages of Pullna, Saidschutz, and Seidlitz, some forty to fifty wells have been sunk into the marl. They have a depth of about ten feet, and serve as receptacles for the atmospheric water which filters through the strata, and in so doing takes up the soluble constituents. For this reason there is a variation in the results of analyses of these waters which have been made at different times. Pullna contains 32.72, Saidschutz but 23.21, and Seidlitz only 16.4 parts of solids in 1,000 parts of water. The latter spring is noteworthy from having given its name to the well-known and popular Seidlitz powders, although they do not contain any of its ingredients. The use of these waters has become limited, and their importation has almost entirely ceased.

Where the bitter waters of Buda-Pesth, the various Hunyadis, Stephans, Victorias, Rakoczys, and some thirty more, are competing now in a hot struggle for ultimate superiority, there was but a large pond about forty years ago, on the banks of which crystals of sodium sulphate were frequently found. The plateau on which this pond existed was drained within the next ten years, and the Kelenfeld cultivated with great success. Wells then became a necessity, and on digging the first in 1863 a water of a salty and bitter taste was obtained, which, on trial, promptly manifested its superior medicinal properties. More wells were soon in order, and all that have been dug have produced waters of similar medicinal value. Although the strength and quantity of these waters depend upon conditions similar to those explained above, it seems that they are not so subject to irregularities in the amount of their solid ingredients as

are other waters of the same class—a fact, perhaps, principally due to the imperviousness of the underlying strata. These wells have a depth of from fifteen to twenty feet, and yield more or less water, according to the season. That their constancy, especially that of the Hunyadi Janos, was maintained for a long time, was shown by the similarity of four analyses, made by as many different chemists, during the period from 1863 to 1870. Their temperature, however, was not so uniform, and, according to the season, ranged from 45° F. in March, to 56° F. in September (Valentiner, *Balneotherapie*, 1876, page 148).

This constancy of the solids has not been so well maintained during later years. While Liebig's analysis in 1870 gave the sum total of solid ingredients as 35.055, R. W. Bunsen found an increase of about 10 per cent. in 1876, or 38.626 parts in 1,000. Whether this increase was due to natural causes or to certain manipulations of the proprietor, Mr. A. Saxlehner, may be a difficult question to decide, but it can not be denied that he was accused in 1877, by some former employes, of having tampered with the different wells, mixed their outputs, and attached to the bottles, which had been filled indiscriminately from this mixture, the label bearing the analysis of J. von Liebig for well No. 3. There are strict laws in Austria against such proceedings, which are rigidly enforced. Information in the form of affidavits to the foregoing effect reached the authorities, and the analysis of J. von Liebig, which used to grace the bottles with its bright scarlet letters, has since disappeared from the labels of Andreas Saxlehner's Hunyadi Janos mineral water. Meanwhile its solid contents seem to be still increasing; at least the last bottle that I examined contained water with 42.59 parts of solids in 1,000, and had a specific gravity of 1.033.

The use of bitter waters by persons who lead a sedentary life, and do not care to give up the pleasures of the table, has become almost universal; but the taste of these waters is abominable and nauseating. However, Professor Dr. R. Fresenius, the eminent chemist, in his opinion on Hunyadi Janos, has given a valuable hint in this direction. He says: "Although its content, of free and half combined carbon dioxide, as in all bitter waters, is not large by itself, it is not insignificant, and no doubt has a beneficial influence upon its taste."

Every one who has ever taken Hunyadi Janos knows that its taste is still far from pleasant, but the thought suggests itself that, if a small amount of carbon dioxide be of such benefit, how much more influential in this respect would a thorough carbonization be. There are very few pharmacists who have not had some disagreeable experience in the handling of imported bitter-waters, on account of deposits and rank odor, a fact which has induced some sagacious dealers to ask permission to draw the cork before delivering the bottle. All such inconveniences could be easily avoided by the recommendation and sale of carbonated artificial

bitter waters, which, by their correctness, freshness, and comparatively fair taste, would quickly supersede the nauseating imported stuff. And it should be borne in mind that carbon dioxide is acknowledged to be an active tonic for the digestive organs, and that bitter waters impregnated with it will tonify and strengthen the intestines, while without its aid their prolonged use will weaken and prostrate them.

Mr. Searby read the following paper, which was accepted and referred:

PICROTOXIN IN BEER.

BY S. F. HUGHES, PH. G.

Beer is a popular drink in this country, and its consumption is incredibly large. There are extensive breweries throughout the country, and large fortunes have been realized from the sale of beer. Malt liquors have an established name for their food value, in virtue of the diastase of malt.

A large percentage of our fellow-men, especially the inhabitants of cities, are not in a good state of health, principally owing to the wear and tear of our mode of living. An innocent aid to nature is sometimes a daily necessity, and hence the assistance of such a ferment as diastase is often a positive benefit. The question of the health of the individual is necessarily an important one, and involves the perpetuity of society. Investigation has demonstrated that one of the chief causes which tend to impair health and shorten life is the adulteration of food and drink.

The general use of beer in this city has called the attention of the writer to this popular drink, and induced him to make an analysis of some samples, to the end that any picrotoxin might be detected.

It is well known that adulterations are often practised in the manufacture of beer, for the purpose of imparting a heading and frothing, or giving it a bitter taste. Alum, Chloride of Sodium and Gentian root are used for the latter; Capsicum, Grains of Paradise, Ginger and Coriander, are also added to give pungency and flavor, also Cocculus Indicus, Quassia, Tobacco leaves, Yarrow, Stramonium seed, Calamus; Coloring, Copperas, Aloes and Black Pepper, are also substances more or less used for adulteration of beer. For the purpose of giving age to new beer, or make it taste as if it was eighteen months old, some sulphuric acid is added. (*On Fermented Liquors*, by Lewis Feuchtwanger, N. Y.)

It is ascertained that whenever beer is a national beverage and enters largely into daily consumption, its adulteration has been undertaken. It is only a few years ago that the world was alarmed by the announcement of an eminent French Chemist, M. Payen, that strychnine was prepared in large quantities in Paris to be employed in the manufacture of the celebrated bitter beer of England. This was a very sensational discovery, when it is remembered that strychnine is remarkable for its highly poisonous nature.

The English government took notice of the adulterations, and numerous acts of Parliament have been passed against them; but notwithstanding this the illicit work has gone on, and cannot easily be entirely prevented. An authority on brewing liquors has stated a variety of articles used in the adulterations. Among these the most deleterious and injurious is picrotoxin, which is the active and poisonous principle of Cocculus Indicus, and is used as a substitute for malt and hops; it imparts a bitter taste and has an inebriating effect.

Picrotoxin is a principle prepared from the seeds of Anamirta paniculata, Nat. Order Menispermaceæ, Formula $C_{15}H_{16}O_6$. It is a powerful poison; a dose of from five to ten grains will kill a dog, and a tincture of the berries, applied to a child's scalp, has been known to cause death. It is often used because it is detected with great difficulty.

As it is a grave truth that the habitual use of impure beer must consequently undermine the human constitution, and thus make the merry beer drinker a *felo de se*, and the subject thus becoming so vitally important to our fellow men, I have carried on with unabated interest my analysis of beer, and the result has been the definite discovery of the poisonous picrotoxin in the beer. The beer we drink is supposed to be a fermented saccharine infusion, to which has been added some wholesome bitter principle. It would alarm the beer drinker to be informed that his beer has been impregnated with an active poisonous principle. I do not make the statement that the brewer puts into the beer the picrotoxin, but he uses an extract of hops which contains the poisonous principle, picrotoxin, to give to the beer its bitter taste and exhilarating effect, and these remarks apply to the sample which I have analyzed.

My analysis was conducted in the following manner: I first evaporated in a water bath two bottles of the suspected beer until nearly solid; this was mixed with a pint of distilled water, to which was added 1 oz. of animal charcoal, and allowed to stand several hours. This was then heated to 100° F., and filtered; it was of a dark wine color. To this was added some basic acetate of lead, which precipitated gum and coloring matter. It was allowed to stand 24 hours and filtered through animal charcoal.

To the filtrate I added some amylic alcohol (about 1 oz.), and allowed it to stand 24 hours, frequently shaking. The alcohol was separated from the aqueous solution and the aqueous solution treated as above with amylic alcohol; the two lots were then mixed and evaporated on a sand bath in a porcelain capsule.

The residue was re dissolved in 50 per cent. alcohol, evaporated to dryness, recovered by a little distilled water, acidulated with H_2SO_4, boiled to expel any volatile matter, some animal charcoal added to eliminate all extractive and coloring matter, and lastly filtered.

I noticed a bitter taste in the clear liquid; this was evaporated and treated with two ounces stronger ether.

The ethereal liquid was separated and evaporated and the picrotoxin collected on the sides of the capsule, it being very small, but a sample ot which I have produced.

I believe that we should have a statute law passed which would strike at this evil of adulteration of beer.

A large portion of our cosmopolitan community drink beer, and they should be protected against its poisonous adulteration.

The sale of picrotoxin for use in beer manufacture should be prohibited, and the safeguard adopted for the drinkers in other countries should be copied here. While the apparatus for good beer is by no means perfect at this date, yet the frothy and spicy article can be made palatable without being made poisonous.

In this connection I will say that I believe that more attention should be paid to the manufacture of pure beer.

Scientific men have given scarcely any attention to the question, which perhaps they consider unworthy of their study. This I consider a palpable error, and it is likewise erroneous to disregard what we may describe as the vulgar necessities of the world.

As votaries of science the duty is imposed upon us to investigate, to the best of our knowledge, the topics which come home to the bosoms of men. It is our part to descend from the ethereal heights of our empire, and bring our knowledge to bear on the arcana of industrial art. It has been justly said that he is a man of science and nothing more, who knows only how to make science useful to himself.

The social question is one of the foremost with which we occupy ourselves at the present day; and the sanitary condition of the people is the gravest of all social questions, for it vitally affects the interests, the well-being, and the existence of the men who compose the state.

To prove the soundness of these suggestions, I will say that the subject has engaged the notice of eminent men in Europe.

The famous benefactor of mankind, Pasteur, aware of the poisonous adulteration of malt liquors, has endeavored to make this vice unnecessary by adding to his other fruitful inventions a new process for improving the manufacture of beer, for which he has received letters patent.

A wealthy Danish gentleman has already set aside one million Danish crowns (about $280,000) for the support of a laboratory in which to carry on scientific research in malt liquors.

The first report of work done in this laboratory has been issued, and it shows that elaborate researches are carried on to establish a scientific basis for the great industries of malting and brewing, and to secure the people against the employment of injurious adulterations.

It should be recorded that the founder of this laboratory, from which so much of scientific interest and technical value has been derived, is Mr. J. C. Jacobson, a Danish gentleman who owns a large brewery in the neighborhood of Copenhagen.

We fear that it will be near the Golden Age of the millennium before the brewers of this country will open laboratories to expose or extirpate the deleterious ingredients of these malt productions.

We are fortunate to have with us such public-spirited citizens as the founder of the New University at Palo Alto, and we believe that his patriotism and intense love of science will lead him to act on the suggestion, such as we have here made, and thus bring his practical benefactions directly to the homes of the people.

In conclusion I will say that I have refrained from stating the label of the producer, as I have been actuated by the pure motive of scientific research, and do not wish to impair the strength of my statements by any inferential or direct imputations against any particular producer.

If the effect of this article will be to attract public notice to the facts which I have stated, and thus bring about an improvement in the properties of a popular and common drink, it will have answered the honest purpose of the writer.

MR. MAISCH.—Were there any tests made?

MR. HUGHES.—Yes, sir, several tests that are generally used for picrotoxin.

MR. MAISCH.—The assertion of the adulteration of beer by means of cocculus indicus is not a new one. That goes back a good many years. I know that about thirty years ago the presence of picrotoxin was proved in some beers in Russia. That I am satisfied of; the authority from which the information came to me privately, was a pretty good one. A number of us will probably remember that some twenty-five years ago, or perhaps during the early part of our war, charges were made that whiskey was adulterated with strychnine, and about the same time that old story about the adulteration of beer with picrotoxin or cocculus indicus was revived. I made it a point at that time to go over the lists of importations, and while I cannot recall the figures now, I know that then the amount of cocculus indicus imported yearly was so minute that all that came into the country, when divided among all the retail apothecaries, each one would not receive two ounces a year.* Now, how is it possible from that amount that a sufficient quantity be used for adulterating the immense quantities of beer that are brewed in this country? I cannot see. I have not learned that in recent years the importation of cocculus indicus has been so materially increased that it could be used for the adulteration of beer, or for the adulteration of anything else.

There are members here who know more about the condition of the wholesale drug market and the kind of drugs than I do; but I have scanned from time to time the lists, and I have not been able to find cocculus indicus indicated in any large amount.† Allu-

* During the year ending June 30, 1867, there were 827 pounds of cocculus indicus imported into the United States. The value was $58, and the duty amounted to $82. (See Proceedings 1868, p. 309.) For the three years ending June, 1871, the average annual importation was 3332 pounds. (See Report Chamber of Commerce of the State of New York, 1871, II., p. 90.)—EDITOR.

† The *Oil, Paint and Drug Reporter's Year-book* for 1883, p. 153, gives the total importation of cocculus indicus for 1881: 58 packages and 6546 pounds; for 1882, 50 packages. The *Druggists' Annual* for 1882, p. 15, states that the weight of original packages (bags) of cocculus indicus is 40 to 100 pounds.—EDITOR.

sion was made to an extract of hops in the market. I don't know to what extract of hops reference has been made, but I do know that in a part of the State of New York where hops are largely cultivated an extract of hops is made, strictly from pure hops. That extract of hops has been examined several years ago; it did not contain any picrotoxin. Now, whether there are other extracts of hops in the market which are thus contaminated I don't know; but it seems to me before the charge is made that nearly all the beer in the market contains picrotoxin, it should be ascertained whether there is enough cocculus indicus in the country to supply the amount that would be necessary for the adulteration, or that a so-called extract of hops containing picrotoxin is an article of commerce. Years ago similar charges were made also with regard to the porter and ale brewed in Great Britain.

MR. SEARBY.—Over thirty, to my knowledge.

MR. MAISCH.—And I believe you will remember also, Mr. Searby, that it was disproved.

MR. SEARBY.—Yes, sir.

MR. WENZELL.—I think I can furnish the link that Prof. Maisch is looking for. I examined the beer in this city about three months ago for picrotoxin. I succeeded in separating picrotoxin in the crystalline form; the quantity, however, was small, not sufficient to do any harm; but it was there, there was no question about that.

MR. HUGHES.—I don't say that all the beer in San Francisco contains picrotoxin. I examined seven samples, and only found one with picrotoxin. Whether it was put in by the brewer himself or by the party who brought it to me, that I don't know. It was brought to me to be analyzed for the purpose of exposing somebody; it was when the brewers were on a strike here. This particular bottle contained picrotoxin, although it was but a very small amount.

MR. MAISCH.—That alters the case very materially. As I understood it, the statement previously made was that the picrotoxin got into the beer by reason of the so-called extract of hops that was in the market. Now it appears that out of a number of samples only one contained picrotoxin, and that the origin of the adulteration has not been traced to its source. I don't believe, as far as I am acquainted with this substance, that the use of picrotoxin or cocculus indicus for the purpose of adulterating beer or malt liquors in general use is carried on to any considerable extent; if carried on at all, it must be exceedingly limited.

MR. EBERT.—For the last twenty years I have come more or less in contact with a large proportion of the brewers of this country, through being engaged in the manufacture of glucose and starch, which are used to some extent in brewing. I have been present when experiments have been made in the use of these materials; and when corn and rice were used. However, I have never known one instance of any other drug used as a substitute, or in any connection whatever in the brewing of beer. They use chemicals when they get into a difficulty—when their beer seems to be changing or when they fear there is going to be a loss by change in the character of the fermentation, then they sometimes use alkali salts; but I feel certain that with the exception that they wish to substitute a cheaper substance for the malt, there are not introduced such substances as alum, chloride of sodium, gentian root, tobacco leaves, yarrow, stramonium seed, calamus, copperas, and such things. I am positive of it, gentlemen—just as positive as I am that we do not put up strychnine when quinine is prescribed. Such charges are usually absurd in themselves. I know something about this extract of hops—that such an ex-

tract is made; I know that at the time when the hops are in the market and cannot be sold, extracts of hops are made and sold to the smaller breweries in the country districts. No other ingredients are used.

MR. WENZELL.—Except gentian.

MR. EBERT.—I doubt if that is used. The bitter of gentian is too powerful. The brewers attempt to make just as pleasant a beverage as they possibly can, and an extremely bitter beverage is not acceptable to the great mass of people.

MR. RAY.—I once found that beer had quite a cathartic effect upon me, so that I quit drinking it. Remarks were made to me by parties that the beer acted on them like a physic, and they wanted to know what was the matter with the beer.

MR. EBERT.—That physicking effect is caused by the corn oil; from the large amount of corn that they use.

MR. RUNYON.—In reply to Mr. Ebert I will say, that at one time, not long ago, extract of aloes was very hard to get in this market, owing to its being bought up by parties engaged in the manufacture of beer. That may account for the purgative effect that was alluded to by Mr. Ray. I don't know that it is customary, but at that particular time a large beer manufacturer was buying extract of aloes. I don't believe that they are doing it now.

MR. RAY.—At that time I was interested in the price of hops, and some way or other we could not sell our hops, but the brewers made beer just the same, and it was just as bitter as if the hops were in there, but the beer was not as good.

MR. HUGHES.—That little reference about the adulterations was copied from a book considered an authority, and is not my own at all; it is simply a copy.

MR. MAISCH.—I presume, one of the authorities Mr. Searby spoke about, and whose assertions were disproved a good many years ago. I will grant that substitutes for hops are occasionally used during times of scarcity, but it would be real folly for the brewers of this country to use such an article generally as cocculus indicus Does Mr. Bedford know anything about the quantity of cocculus indicus that comes into the market at the present time?

MR. BEDFORD.—I cannot tell you exactly, but it is small.

MR. MAISCH.—Perhaps some of the members may remember what was said at a former meeting of the American Pharmaceutical Association many years ago, when a similar subject came up. It was then stated that there came into New York at one time a quantity of cocculus indicus in ballast which could not be sold, and which was put away and remained on hand for quite a long time before it was gradually disposed of. I have not learned that it now enters the country in a state of extract, or in some other form by which its real nature is hidden. If we have only say five hundred or five thousand pounds of cocculus indicus coming into the market during the year, it is certainly impossible that it should be largely used for the adulteration of beer. I will say that I have no connection whatever with a brewery, either directly or indirectly.

MR. HALLBERG.—As this is a subject I know something about, I would like to say that the danger in the adulteration of beer does not lie in the bitter that is used; it lies n the fact that they use much more rice than malt, and that is why we have poor beer. I don't consider weiss beer good at all. It lacks the constituents that malt has, and as a food it has no value whatever. If the American people would become really a temper-

ate people, and use malt liquors to the displacement of alcoholic liquors, we must have the brewers make true beer from malt and hops, and not these villainous infusions that we have now made chiefly from rice.

MR. HEINITSH.—In 1846 or 1847 there were five hundred bags of cocculus imported as ballast, without any sale for it; it came into New York, and was bought in part by a firm in Philadelphia. It lay there for some years, and for the first year or so it was put up in the loft, till finally the first sale was five bags, the next sale was another five bags, the next ten bags, and so on, till finally the whole of it was gone; but where it went to they never knew.

MR. JAMES.—Cocculus is sometimes used by certain parties for the intoxication of fish; perhaps that is what became of that lot.

MR. BEDFORD.—Is it not proper to expunge that portion of the paper, if the author is satisfied to do that?

MR. CALVERT.—But you are forgetting one fact: the author asserts that he found cocculus indicus, and that beer is adulterated with it; there is also the fact that there is on the market and sold commonly to all the brewers extract of hops. There is no doubt that beer is adulterated. I myself have been poisoned by beer in this city, and I don't drink any large quantity. I have had my skin in a condition where it was just exactly as if I had an intense skin disease. I referred the matter to some physicians, and they told me it was produced by strychnine poisoning. Strychnine produces that effect in continued doses.

MR. WENZELL.—The beer that I examined was the beer commonly called steam beer. It is used among the lower classes of the people. It is cheap, and in order to make it more intoxicating, that particular brewery has probably availed itself of this substance. The higher grades of beer have been analyzed, and they do not contain picrotoxin; it has only been found in that particular low grade steam beer.

Two papers, on the Active Constituents of Cascara Sagrada, and on Salicylic Acid, its isomers and homologues, were read by title and referred for publication.

ACTIVE CONSTITUENTS OF RHAMNUS PURSHIANA.

(*Cascara Sagrada.*)

BY A. C. ZEIG, ANN ARBOR, MICH.

Rhamnus purshiana is a native of California, or more properly speaking, of the Pacific slope. Its name was given in honor of Frederick Pursh, the renowned Prussian botanist, who, in 1814, gave it a full description, which fixed its place in botany, his investigation having been made upon specimens obtained directly from the habitat.

This drug was first brought to notice by Dr. Bundy, and was called cascara sagrada by the early Mexican settlers in California, the term meaning holy bark. It is now principally known in the Western States as chittem bark.

A good deal has been said of late in the various journals of pharmacy, concerning this drug as well as some of its galenical preparations. The high price which it has commanded in the drug market the past year in-

duced a great rush in gathering the same, and has had a great tendency to bring on the market a drug much inferior in quality, by having been gathered out of season; and again it has had a tendency to bring on the market a substitute or adulterant (a species of alder, as F. A. Beckett says), which, although quite similar to cascara in appearance and taste, is of no value whatever as an aperient, for it does not contain the active constituents present in cascara sagrada.

As to the chemical constituents of Rhamnus purshiana, I shall call attention to what investigators have contributed to our knowledge through their reports in the various journals of pharmacy. Prof. A. B. Prescott gives in the *American Journal of Pharmacy* for 1879 (see list of references at the close of the article) the results of his investigations, both microscopic and chemical, among which he reports the presence of three resins—a brown, a yellow, and a red resin—a crystallizable body, three vegetable acids, as tannic, oxalic and malic, both a fat and a volatile oil, wax and starch. In addition to this, Prof. Wenzell states, in the *Pharmaceutical Journal* of 1886, that he has obtained a substance which he describes as being of a deep orange red color, namely a glucoside.

Messrs. Meier and Webber report in the *American Journal of Pharmacy* of last year, as the result of their investigation, the presence of a vegetable ferment, glucose and traces of ammonia, while Dr. Eccles reports, in the *Druggists' Circular* for 1888, having discovered the presence of an alkaloid, which he states, he has separated from the fluid extract and precipitated with Mayer's reagent.

Its extensive use in practice, especially in the form of the fluid extract, has amply confirmed that the drug possesses decided laxative properties. Furthermore, it is set forth by some and denied by others that it also possesses tonic properties. To which of these constituents just enumerated could the laxative and tonic powers of cascara be due?

Messrs. Parke, Davis & Co. were kind enough to send me a sample of the drug, and I undertook to estimate the quantity of each of the different resins present, and by physiological experiment ascertain as to which is the most active. Furthermore, I undertook to make out a working formula for obtaining the resin in a concentrated form.

The method suggested by Mr. Wise, in *Western Druggist*, was first employed for the separation of the three resins. A fluid extract was prepared, using strong alcohol as a menstruum. To this fluid extract was added an equal volume of ether, the mixture agitated and allowed to stand for twenty-four hours.

The ethereal liquid was then decanted and strained, the precipitate washed, dried and weighed. The product consisted of a red resin, soluble in alcohol and insoluble in ether. The amount of this resin obtained from 114 gm. of drug was 6.15 grams, which by physiological experiment appeared to be quite inert.

The ethereal liquid was next evaporated to a somewhat syrupy consistence, seventy per cent. alcohol was added, and the whole allowed to stand for some time. The alcoholic solution was then strained and the precipitate washed and dried. This precipitate consisted of a yellowish brown resin, odorless, but having a slight bitter taste. The quantity obtained from 114 gm. of drug was 1.23 grams. By physiological experiment this portion showed itself quite inert.

The strained alcoholic solution obtained as stated in last paragraph was then evaporated to dry syrupy consistence, and slowly decanted into water acidulated with hydrochloric acid. The liquid was now strained, the precipitate washed and dried. This consisted of a third resin, of a dark brown color, giving an intense purple with potassium hydrate, having a somewhat bitter taste, and an odor much like the odor of the drug. Physiological experiment showed that it is the most active resin of the drug.

The next thing in view was to obtain some cheap and practical formula for obtaining this resin in a concentrated form. The method suggested by Mr. Wise for separating the resins is open to but one special objection, namely, that of being too expensive a method, as it employs the use of a large quantity of ether as a precipitant. Various other precipitants were tried instead of ether, but without success. Finally, I found that by using dilute alcohol as a menstruum in percolating the drug, very little of the inert resin is dissolved, and the use of ether as a precipitant may be avoided. As a formula for obtaining the active resin, I would recommend the following:

Rhamnus purshiana, No. 40 pwd.	8 oz.
Dilute alcohol,	
Water	each q. s.
Hydrochloric acid	2 fl. drams.

Moisten the powder with 8 fl. oz. of dilute alcohol, and pack it firmly in a cylindrical percolator, add enough dilute alcohol to saturate the powder and leave a stratum above it. When the liquid begins to drop from the percolator close the lower orifice, and having closely covered the percolator, macerate for twenty-four hours. Then allow the percolation to proceed, gradually adding dilute alcohol until 12 fl. oz. of percolate are obtained, or until it produces but a slight turbidity when dropped into acidulated water. Evaporate off the dilute alcohol upon a water bath until the percolate is reduced to a syrupy consistence, and pour it slowly with constant stirring into eight fl. oz. of water containing the hydrochloric acid. Let it stand until the precipitate has subsided, then decant the supernatant liquid and wash the precipitate three times by decantation with fresh portions of cold water. Spread it on a strainer, and having pressed out the liquid, dry the resin by exposure to air at a gentle heat. This resin dissolves in potassium hydrate, giving an intense purple color, which disappears upon acidulating with hydrochloric acid,

when the resin is again precipitated, and may in this manner be obtained devoid of bitterness. Five grains of this resin, a bitter resin, had a marked laxative effect upon an adult.

Now as to the glucoside mentioned, which, according to Messrs. Meier and Webber, seems to be peculiar to Rhamnus purshiana, as these authors were unable to determine its presence in Rhamnus frangula as found in the market, it may be regarded as one of the important constituents of the drug and the source of an intensely bitter principle (Meier and Webber), to which no doubt the tonic property is due. It may, according to the above authors, be obtained in quite a pure state for examination by making an aqueous percolate of the drug and precipitating with a solution of subacetate of lead. The excess of lead may be removed by passing hydrogen sulphide into the solution, precipitating the lead as a sulphide, and filtering. This filtrate shows decided chemical change when boiled with sulphuric or hydrochloric acid, giving off a peculiar odor. When examined with the aid of a microscope there is visible an oily and resinous substance with small crystals distributed through it. This resinous substance appears to be soluble in alcohol or potassium hydrate, and insoluble in water. With potassium hydrate, it turns a reddish brown. As the glucoside is capable of decomposition when treated with acids in a test tube, it would likewise be capable of decomposition in the gastric juice of the stomach (Meier and Webber), which contains two-tenths of one per.cent. of hydrochloric acid.

The resins, as has been stated before, may be obtained devoid of bitterness, while the glucoside is in itself not bitter (Meier and Webber), but is the source of the bitter principle when treated with acids; therefore it appears possible that there may be made a preparation of cascara sagrada quite tasteless, yet containing all the active constituents to which both its laxative and tonic properties are due.

The following is a list of references on the constituents of Rhamnus purshiana (Cascara Sagrada):

PRESCOTT, 1879: New Preparations, Detroit, 3, 27; Am. Jour. Phar., 51, 165; Archiv. der Phar. [3] 15, 547.

WENZELL, 1886: Phar. Rundschau, 4, 79; Proc. Am. Phar. Assoc., 34, 462.

LIMOUSIN, 1886: Phar. Jour. Trans. [3] 15, 615.

WISE, H., 1885: Western Druggist, 7, 125.

ECCLES, R. G., 1888: Druggists' Circular, page 54, March; Proc. Am. Phar. Assoc., 36, 402.

SCHWABE, P., 1888: Archiv der Phar.

MEIER and WEBBER, 1888: Am. Jour. Phar., 60, 87; Proc. Am. Phar. Assoc., 36, 400.

FUGE, H. D., 1889: Phar. Jour. Trans. [3] 18, 736. On Galenicals.

University of Michigan, June, 1889.

SALICYLIC ACID, ITS ISOMERS AND HOMOLOGUES.

BY BERNARD C. HESSE, ANN ARBOR, MICH.

The object is to ascertain some ready and practical method for the determination of the isomers and homologues of salicylic acid, as present in this article when made from carbolic acid [A].*

SYNOPSIS.

1. Estimation of the carbon dioxide evolved when the acids are heated:
   I. With lime.
   II. With concentrated hydrochloric acid, and
   III. With concentrated phosphoric acid.
2. Determining the amount of U. S. P. hydrochloric acid required to discharge the color produced by ferric chloride.
3. Determining the amount of ammonia required to neutralize the acids.
4. By the use of copper sulphate solution:
   I. In the presence of alkali hydrates.
   II. With the use of hydrochloric acid to destroy the green color produced in solution of salicylates.
5. Comparison of these methods as well as others on a commercial sample, with interpretations.
6. Tabular view of the leading features of the six acids liable to be in salicylic acid when made from carbolic acid.
7. References and literature.

1. Estimation of the carbon dioxide evolved when the acids are heated:

(1) With lime.

This depends on the fact that when salicylic acid and its homologues are heated with lime [B], they yield their corresponding phenols and carbon dioxide.

The object was to decompose salicylic acid by means of lime and heat; then to estimate the amount of carbon dioxide retained by the lime. This was attempted but once, when its defects became so obvious that it was given up.

These defects were as follows: first, that the amount of carbon dioxide previously combined with the lime was very considerable and variable; second, that the absorption of carbon dioxide by the lime would be very variable, and dependent in a great measure on circumstances and conditions. One estimation was made which gave altogether too high results.

(2) When heated with concentrated hydrochloric acid.

This depends on the fact that when salicylic acid [C], its isomers [C], and its homologues [D], are heated with hydrochloric acid they yield their corresponding phenols and carbon dioxide. The temperatures of decomposition are for:

* See reference at the end of this article.

Orthohydroxybenzoic acid	140° to 145° C.
Metahydroxybenzoic acid	a very high heat.
Parahydroxybenzoic acid	135° to 145° C.
Cresotic acid 1 : 2 : 3	210° C.
Cresotic acid 1 : 2 : 4	170° C.
Cresotic acid 1 : 2 : 5	180° to 185° C.

The operation was as follows: Place a weighed quantity of salicylic acid in a flask with an excess of concentrated hydrochloric acid. Connect this flask with another smaller flask containing sulphuric acid—this is to take up moisture and phenol [E].

The tube from the first flask is to be about one-quarter inch above the surface of the sulphuric acid. This flask is then connected with a calcium chloride tube containing concentrated sulphuric acid, to take up any phenol which may have escaped the sulphuric acid in the flask. This calcium chloride tube was connected with a U tube containing granulated calcium chloride, and this with another calcium chloride tube containing in one arm calcium chloride and in the other copper sulphate (anhydrous) and pumice stone. Then came the potash bulbs, followed by a calcium chloride tube containing soda-lime and calcium chloride, and finally a bottle aspirator. But it was found that hydrochloric acid could not be used, because it was all dissipated before even 80° C. was reached.

Concentrated orthophosphoric acid (III.) was next employed with satisfactory results. This acid decomposes salicylic acid at 120° C. (F), but no statement could be found as to its action on the isomers and homologues. It was found that the decomposing flask could be heated very well in a copper water bath lined with pieces of asbestos felt. In the following table are expressed the theoretical amounts of carbon dioxide which different mixtures of salicylic and cresotic acids should yield when decomposed into phenol and carbon dioxide.

Per cent. of Salicylic Acid.	Per cent. of Hydroxytoluic Acid.	Wt. of CO_2 from 1 gram of the mixture.	Wt. of CO_2 from 15 grams of the mixture.	Per cent. of Salicylic Acid.	Per cent. of Hydroxytoluic Acid.	Wt. of CO_2 from 1 gram of the mixture.	Wt. of CO_2 from 15 grams of the mixture.
100	0	0.3196	4.7940	45	55	0.3021	4.5465
95	5	0.3181	4.7715	40	60	0.3016	4.5240
90	10	0.3166	4.7490	35	65	0.3001	4.5015
85	15	0.3151	4.7265	30	70	0.2986	4.4790
80	20	0.3136	4.7040	25	75	0.2971	4.4565
75	25	0.3121	4.6815	20	80	0.2956	4.4340
70	30	0.3106	4.6590	15	85	0.2941	4.4115
65	35	0.3091	4.6365	10	90	0.2926	4.3890
60	40	0.3076	4.6140	5	95	0.2911	4.3665
55	45	0.3061	4.5915	0	100	0.2901	4.3515
50	50	0.3046	4.5690				

On trying this method with a salicylic acid made from oil of wintergreen by saponifying with potassium hydrate, decomposing the soap with hydrochloric acid and recrystallizing three times from hot water and twice from alcohol, but without treatment with animal charcoal, the following results were obtained:

Amount of acids taken in grams.	CO_2 obtained.	CO_2 obtained figured to the amount from 1 gm	Difference plus or minus from 0.3196	Per cent. of CO_2 obtained 0.3196=100 per cent.	Interpretation of results according to table above.
I. 1.0105	0.3048	0.30163	—0.0033	94.408	60 per cent. cresotic acid.
II. 0.4275	0.2135	0.49473	+0.17513	154.8	. . . .
III. 0.312	0.1130	0.3621	+0.0425	113.29	. . . .
IV. 0.9922	0.3005	0.3028	—0.0168	94.74	Between 55 and 60 per cent. of cresotic acid.
V. 1.0000	0.3003	0.3030	—0.0166	94.806	Ditto.

From the above table it will be seen that experiments I., IV., and V., are about six per cent. too low, and that among themselves they agree quite closely. This low yield of carbon dioxide can only be explained by the fact that the acid used was in very large crystals, which may have mechanically retained some impurities which simple recrystallization could not remove. Experiments II. and III. are very much too high. This may be explained by the fact that the apparatus "sucked back," during the operation, drawing some sulphuric acid from the drying flask into the decomposing flask. The sulphuric acid charred some of the salicylic acid, and the resulting carbon reduced the sulphuric acid to sulphur dioxide, which was absorbed in the potash bulbs and weighed as carbon dioxide. Attention has been called to this point in 1880 by B. Vangel [F].

In the interpretation of the results in the above table it was assumed that the isomers and homologues would also be decomposed at 180° to 200° C., to which temperatures the flask was heated. When this was tried on a commercial sample yielding by acidimetry, as proposed by Mr. E. E. Ewell [G], figures corresponding to 35 or 40 per cent. of cresotic acids, 191.4 milligrams of carbon dioxide were obtained from one gram of the sample.

This is too low, even though the acid be pure hydroxytoluic acid. But if this carbon dioxide is now calculated into salicylic acid, 600.28 mgms. will be obtained as the amount of salicylic acid in one gram of the acid taken. This corresponds to 60.028 per cent., almost in accordance with the results obtained by acidimetry. Attention is called to the statement

of B. Vangel [F], that when salicylic acid is heated with syrupy phosphoric acid, it decomposes at 120°; at 159° a portion of the undecomposed acid sublimes. It was found that a very large amount of crystals had sublimed to the top of the flask, when 88° C. had been reached. In two other cases sublimation was observed at 42° C. and 55° C. In the first case the phosphoric acid was poured so as to have the salicylic acid on its surface as much as possible, and in the second case the acids were well intermixed.

It was also found that when a commercial acid was subjected to heat in a drying-oven, sublimation began at about 73° C., and when 90° C. had been reached the sublimate had become very large in quantity. These results practically confirm those of Mr. Ewell [G]. It is perhaps worthy of notice that the sulphuric acid retained all the phenol, and only once in thirteen instances did any phenol get into the potash bulbs, as was attested by bromine water after the excess of alkali had been neutralized.

2. *Determining the amount of U. S. P. hydrochloric acid required to discharge the color produced by ferric chloride.*

When salicylic acid is treated with ferric chloride, a purple color results, which is discharged by hydrochloric, acetic, and other acids [H]. On these facts experiments were made, to base some method of estimating the amount of salicylic acid present in mixtures of its isomers and homologues. These acids react with ferric chloride as follows [D and K.]:

Ortho hydroxybenzoic acid	a violet color.
Meta-hydroxybenzoic acid	no color.
Para-hydroxybenzoic acid	yellow precipitate.
Cresotic acid 1:2:3	intense violet.
Cresotic acid 1:2:4	intense violet.
Cresotic acid 1:2:5	blue violet.

Experiments were made as follows:

A solution of salicylic acid, containing 2 mgms. of acid to each cc. was made up; also a solution of ferric chloride containing 66.6 per cent. of ferric chloride and some U. S. P. hydrochloric acid, sp. gr. 1.16, and containing 31.9 per cent. of absolute hydrochloric acid.

Ten cc. of the salicylic acid solution were placed in a flask and five drops of ferric chloride solution added; hydrochloric acid was then run in from a burette until the liquid became a clear yellow color. The following results were obtained:

With 5 cc.	of salicylic	solution	0.7 cc.	hydrochloric acid	were used.
With 10 cc.	"	"	1.4 cc.	" "	"
With 15 cc.	"	"	2.1 cc.	" "	"

Then an unknown number of cc. of the salicylic solution was taken and titrated in the same manner. The results are as follows:

GIVEN.	FOUND.
6.0 cc.	6.07 cc.
4.0 cc.	4.01 cc.
3.5 cc.	3.58 cc.
9.5 cc.	9.56 cc.

These results are all a little too high, but if duplicates could have been worked they might have been a little closer. Then experiments were made to ascertain what influence a change in the relation between the amount of salicylic acid present and the liquid volume would have. In this case the liquid volume remained constant, namely, 10 cc.; the amount of ferric chloride remained constant also, namely 5 drops. In the table below are given the results of these experiments. In the ratio between salicylic acid and hydrochloric acid, salicylic acid is taken as unity:

Milligrams of salicylic acid taken.	One-tenth cc. of U. S. P. HCl used.	Ratio between salicylic acid taken and HCl required.	Milligrams of salicylic acid taken.	One tenth cc. of U. S. P. HCl required.	Ratio between the salicylic acid taken and the HCl.
1	4	1:4.0	11	10	1:0.909
2	5	1:2.5	12	10	1:0.833
3	6	1:2.0	13	11	1:0.846
4	7	1:1.75	14	11	1:0.785
5	8	1:1.60	15	12	1:0.800
6	8	1:1.33	16	12	1:0.750
7	9	1:1.28	17	12	1:0.705
8	9	1:1.12	18	13	1:0.722
9	10	1:1.11	19	13	1:0.684
10	10	1:1.00	20	14	1:0.700

It will be seen that liquid volume is a very important factor.

It seems as though the homologues affected this reaction somewhat. An acid of the market, yielding both by acidimetry and carbon dioxide, estimation figures corresponding to 60 per cent. of salicylic acid and 40 per cent. of homologues, yielded with this ferric chloride method results corresponding to pure salicylic acid, namely 1.4 cc. of hydrochloric acid were required to discharge the violet color produced by ferric chloride in 10 cc. of a solution containing 20 milligrams of the acid. This shows that work must be done on the homologues and isomers before this method can be of any use.

3. Determining the amount of ammonia required to neutralize the acids. When dry, salicylic acid absorbs one molecule of ammonia, while its isomers and nitrosalicylic acid absorb two molecules [D[1]]. Experiments were made to see the if the commercial acid would absorb an excess of ammonia. The results showed that it did not. In these experiments the acid was dissolved in the ammonia water, and so was not dry. But the

absence of isomers was proved by the complete solubility of one gram of the acid in 53 cc. of chloroform.

This method may be of some use, but needs more detailed work.

4. The use of copper sulphate solution.

(1) In alkaline mixture.

When one molecule of salicylic acid is treated with two of sodium hydrate, it will prevent the precipitation of one-half molecule of copper oxide [I and D].

For this a solution of sodium hydrate containing 80 mgms. to the cc. was made up, also one of crystallized copper sulphate containing 124.6 mgms. to the cc.

The operation was as follows:

Weigh out 138 mgms. of salicylic acid and dissolve in one cc. of the soda solution; then add from a burette the copper sulphate solution. If the acid used be pure salicylic acid (or any aromatic ortho-acid), no precipitate should be observed. This operation was tried three successive times on pure acid, and the same results obtained each time. Then the commercial acid was subjected to the same treatment. Permanent precipitation was observed when but 0.5 cc. of copper sulphate solution had been added. A full cc. of copper sulphate solution, however, was added, and the precipitate filtered out and estimated by potassium cyanide.

On two different trials this precipitate equalled 52.04 per cent. and 51.9 respectively of crystallized copper sulphate taken. It would seem remarkable that 40 per cent. of impurity should precipitate 52 per cent. of the copper sulphate taken, and 60 per cent. of salicylic acid should hold only 48 per cent. of copper hydrate in solution. This is deserving of further investigation.

(2) Use of hydrochloric acid to destroy the green color produced by copper sulphate in solutions of salicylates.

This depends on the fact that when an aqueous solution of a salicylate is treated with copper sulphate solution an intense emerald green color is produced, which is discharged by ammonia and strong acids [J].

Not much work could be done on this, but it was ascertained that 0.2 cc. of hydrochloric acid (U. S. P.) discharged the green color in 10 cc. of 0.02 per cent. of solution of salicylic acid and of the commercial acid, but that liquid volume did not interfere.

5. Comparison of Methods.

The following is a tabular arrangement of the results obtained by the different methods, when applied to the same commercial sample of salicylic acid:

Acidimetry.	CO_2 estimation.	Fe_2Cl_6 method.	Absorption of NH_3.	$CuSO_4$ in alkaline solution.	HCl to decolorize green color of Cu SO_4 in salicylate.
One gram of acid required 699.8 c.c. of $\frac{n}{10}$ KOH, an average of 3 titrations.	One gram of acid yielded enough CO^2 for 617 mgms. of salicylic acid.	10 c.c. of a solution containing 20 mgms. of salicylic acid required 1.4 + c.c. of U. S. P. HCl to discharge the violet color caused by Fe_2Cl_6.	The same amount required as with pure acid.	Yielded a ppt. when but ¼ mol of $CuSO_4$ had been added. When 124.5 mgms. of Cu SO_4 had been added the ppt. equalled 52 per cent. of the $CuSO_4$ taken.	Same am't of HCl required as for a pure acid.
Indicates 35 to 40 per cent. hydroxytoluic acid.	Indicates 38.3 per cent. acid other than salicylic.	Indicates a pure acid!	Indicates a pure acid!	Indicates the presence of acids other than ortho acids.	Indicates a pure acid!

From the above it would seem that the method by acidimetry furnished a ready and quite accurate method for the estimation of homologous acids, as is confirmed by the estimation of carbon dioxide. Also that the precipitation of cupric hydrate from carefully standardized solutions is a quite ready and reliable method for the detection of acids *other* than ortho, since the property of preventing the precipitation of cupric hydrate by fixed alkali hydrates seems to belong to the aromatic *ortho* acids in general and not to salicylic acid in particular [G].

The discharging of the colors, caused in solutions of salicylic acid by ferric chloride, and of salicylates by copper sulphate, by hydrochloric acid, is not trustworthy without further detailed work on the isomers and the homologues and their behaviour towards these reagents, both when free and mixed with salicylic acid.

The method by acidimetry might well be considered as to its fitness for a pharmacopœial requirement in controlling the quantities of homologous acids present in salicylic acid, and with further detailed work the method with copper sulphate solution might have claims for secondary use.

The estimation of carbon dioxide is too cumbrous for ordinary purposes, but might serve as a control analysis. In this method it is well that the decomposing flask be tall, so that any acid that sublimes may be condensed rather than drawn outside of the flask into the rest of the apparatus, and thus lost for estimation and vitiating the results. The temperature most to be recommended is between 120° and 130° C.

6. Tabular View of

	Crystalline forms.	Solubility in 100 parts of water at 0°C.	Solubility in 100 parts of water at 15° C.	Solubility in 100 parts of water at 100° C.	Solubility in alcohol.	Solubility in ether.	Solubility in chloroform.
Ortho-hydroxy-benzoic acid.	Fine needles from water; monoclinic prisms from alcohol. D, 1430.	0.092 parts. D, 1431.	0.225 parts. D, 1431.	7.925 parts. D, 1431.	Soluble in 2.4 parts. K, 443.	100 parts dissolve 50.47 parts. D, 1431.	Very soluble. L, 549. D, 1431.
Meta-hydroxy-benzoic acid.	Needles collected in little warts. D, 1444.	0.377 parts. D, 1444.	At 18° C. 0.925 parts. D, 1444.	Very soluble. D, 1444.			Almost insoluble. Kolbe, 1874; Jour. pr. Chem. (2), 10, 102.
Para-hydroxy-benzoic-acid.	Small monoclinic prisms from water; larger ones from alcohol. D, 1449.	0.172 parts. D, 1448.	0.793 parts, Saytzeff, 1863; Ann. Chem. Pharm., 127, p. 129. D, 1448.	Very soluble, Saytzeff, 1863, Ann. Chem. Pharm., 127, p. 129. D, 1448.	Easily soluble, Saytseff, 1863; Ann. Chem. Pharm., 127, p. 129	Easily soluble, Saytzeff, 1863; Ann. Chem. Pharm., 127, p. 129.	Almost insoluble. Kolbe, 1874; Jour. pr. Chem. (2), 10, 102.
Hydroxy-toluic acid, CO_2H; OH: CH_3, 1:2:3.	Long flat needles from water. D, 1458.		Sparingly soluble. D. 1458.				Easily soluble in the cold. D, 1458.
Hydroxy-toluic acid, CO_2H; OH: CH_3, 1:1:4.	Needles from water; monoclinic prisms from alcohol. D, 1459.		Sparingly soluble. D, 1459.	Quite readily soluble. O. Jacobsen, Berichte, 14, 41.	Readily soluble. O. Jacobsen, Berichte, 14, 41.	Readily soluble. O. Jacobsen, Berichte, 14, 41.	Sparingly soluble. O. Jacobsen, Berichte, 14, 41.
Hydroxy-toluic acid, CO_2H; OH: CH_3, 1:2:5.	Very long needles from water. D, 1458.		Sparingly soluble. D, 1458.	Readily soluble. D, 1458.	Easily soluble. K, 443.	Readily soluble. D, 1458.	Readily soluble. D, 1458.

Isomers and Homologues.

Melting points.	Reaction with Fe_2Cl_6.	Heated in a sealed tube with concentrated HCl.	Heated with concentrated H_3PO_4.	When treated with fixed alkali hydrate and $CuSO_4$ solution.	When heated with CaO.	Vaporizing.
155° to 156°. D, 1431; K, 443; L, 549; M. I, 174. Rechenberg Jour. pr. Chem. (2), 22, 243; Jour. Chem. Soc., 40, 11.	Violet color.	Yields CO_2 and phenol at 140° to 150°.	Yields CO_2 phenol at 120°.	A blue-green color preceded by a precipitate soluble in an excess of the acid.	Yields CO_2 and phenol.	With steam, Liebermann and Dehust, Berichte, 12, 1291.
	D, 1431. L, 549, K, 443.	C; L, 551.	F.	I.	B.	K, 443.
200°. D, 1444; K, 443; L, 550; M. I, 174; Rechenberg Jour. pr. Chemie (2), 22, 243; Jour. Chem. Soc., 40, 11.	No color.	Decomposes at a high temperature.		Immediate precipitation.		Not with steam. Liebermann and Dehust, Berichte, 12, 1291.
	D, 1445; K, 443; L, 550.	C.		I.		K, 443.
210°. D, 1448; K, 443; L, 551; M. I. 174; Rechenberg Jour. pr Chemie (2), 22, 243; Jour. Chem. Soc, 40, 11.	Dirty yellow precipitate.	Yields CO_2 and phenol at 135° to 140°.		Immediate precipitation.		Not with steam, Liebermann and Dehust, Berichte, 12, 1291.
	D, 1449; K, 443; L, 551.	C.		I.		K, 443.
163° to 164°. D, 1458; 160°. K, 443; 160°. K, 443; 168°. M. I, 190; Jacobsen, Berichte, 16, 1963; Jour. Chem. Soc., 44, 1124.	Intense violet.	Yields CO_2 and ortho-cresol at 210°.				With steam.
	D, 1458; K, 443.	D, 1458.				K, 443.
177°. D, 1459; 173°. K, 443; 172°. M. I, 190; Jacobsen, Berichte. 14, 41; 963; Jour. Chem. Soc., 40, 599; 46, 745.	Intense violet. D, 1459; K, 443. Precipitation, O. Jacobsen, Berichte, 14, 41.	Yields CO_2 and meta-cresol at 170°.				With steam.
		D, 1459.				K, 443.
151°. D, 1458; K, 443; 177° to 178°. M. I, 191; Tiemann and Schotten, Berichte, 11, 778; 12, 1340; Jour. Chem. Soc., 34, 877; Schall, Berichte, 12, 820; Jour. Chem. Soc., 36, 794.	Intense blue violet.	Yields CO_2 and p. cresol at 180° to 185°.			Ortho-cresol and CO_2 are formed.	With steam.
	D, 1458; K, 443.	D, 1458.			D, 1458.	K. 443.

7. *Literature.*

[*The letters correspond to those in the preceding pages.*]

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University of Michigan, June, 1889.

The reading of the papers being concluded, the chair appointed Messrs. Ray and Wenzell a committee to conduct the newly elected chairman to his seat.

CHAIRMAN WHELPLEY.—Gentlemen, in accepting this honor I will not occupy any time at this late hour, but I hope that you all feel as deeply as I do that the success of this Section does not depend upon its officers, but upon the individuals, and that you will all meet with us next year prepared with papers to present, and prepared to discuss the papers that are read before us, and that you will remember that the fifteen months, between now and the next meeting, is sufficient time to prepare papers.

On motion of Dr. Melvin, the thanks of the Section were tendered to the retiring chairman for the able manner in which he conducted the business of the Section.

In the absence of Mr. Dare, Secretary elect, the chair appointed W. L. Dewoody Secretary *pro tempore*.

The following report was read by Mr. Searby:

The Committee appointed to watch the working of the order of business recommended by the chairman of this Section, beg to report:

That they find that the order facilitates the transaction of business with all the dispatch consistent with a due consideration and discussion of the papers presented. They therefore recommend it as a standing order of business for this Section.

Your Committee also recommend (1) that the Committee on Scientific Papers call the attention of writers of papers to Chapter 7, Article IV. of our By-Laws, requiring a synopsis of their papers to be presented to the officers of this Section previous to the first session of the Association; (2) that they also act, as far as is practicable as a Board of Censors, to determine the fitness of papers to be presented to the Section, and (3) that they be authorized to recommend that certain papers be read by abstract only, and others in full, but the recommendation to read by abstract only shall require the unanimous concurrence of the Committee.

The Committee also concur in the recommendation of the chairman, that a committee be appointed to submit a List of Queries to the Chairman of the Scientific Section within thirty days after adjournment of the Association.

W. M. SEARBY,
FRED. B. HULTING.

The report was accepted, and the recommendations were ordered to be considered *seriatim*.

The proposed standing order of business for this section was adopted.

The first recommendation, relating to the Committee on Scientific Papers, was read and adopted.

The second recommendation was read.

MR. SEARBY.—Allow me to say in explanation, the reason why we made the recommendation that the Committee on Scientific Papers act as a board of censors is this: Two years ago, in order to facilitate business, it was decided that the papers should be printed in advance, so that we could more intelligently read them and more quickly dispose of them. Some papers presented have a good deal of statistical matter, and the results of a series of experiments and things of that kind. If the Committee of this Section took the opportunity of reading all of the papers before they came here, such papers

as are filled largely with statistical and similar matter could be recommended to be read in a condensed form by abstract, while those which are more particularly suitable for discussion could be read in full.

MR. EBERT.—We have a Chairman, a sub-Chairman and a Secretary. Those three gentlemen are a Committee for this very purpose. Another Committee appointed at the time of a meeting for such a purpose, would be subjected to a hardship which this Section cannot ask of three members.

MR. SEARBY.—The report recommends that the Association Committee on Scientific Papers who are appointed already, act as a Board of Censors, not another Committee.

MR. EBERT.—But that is their very duty, is it not?

MR. SEARBY.—It is a duty they have failed to perform, because the papers have come here in abundance, and we did not know which of them should be read by title only, and which by abstract.

MR. HALLBERG.—I have a suggestion to make in connection with this, that I think is of considerable importance. Quite a number of the papers received here should be read before some other Sections; I think that the Chairman with his colleagues should, before the meetings commence, determine what papers should be referred to other Sections.

MR. PAINTER.—That is certainly a very good suggestion. If the Committee have power to do so, it would enable them to dispose of a number of papers in a proper manner, without bringing them before this Section; but as to the Committee preparing a synopsis of these papers, it is too much to expect. They have enough on their hands to get them printed, to correct the copies, and bring them here. It is the duty of the author of the paper to prepare a suitable synopsis. The author of a paper who will write forty pages, knows that these cannot be read at the meeting, and it is mentioned in the By laws that he should present a synopsis of his paper, which will enable the Committee to apportion the work.

The Secretary read Chapter 7, Article IV. of the By-laws.

MR. SEARBY.—I believe that we could amend that article so as to meet the objection of Mr. Ebert, making it read so "as to ensure its presentation to the Association." The most of the papers are printed before, and in printing them and reading them they can see in a moment that a large portion of it is unsuitable to be read at such a meeting.

MR. EBERT.—Don't let us make any more rules. You will probably not be troubled next year, or the year after, with so many papers. Some years we have not had enough; this time we have got so many that you are a little frightened, but we have got along very well. Just let the officers of this Section take care of all the work they can, and you will find that they have not any too much.

MR. CALVERT.—Why should not such articles as those of Mr. Whelpley and Mr. Stuart go, the one to the Committee on Education, and the other to the Committee on Legislation?

MR. PAINTER.—These reports are sent to the chairman of the Scientific Section. He being the one that issues the list of queries, and those queries being included in the list, naturally the papers came to him; but the proposition to apportion such papers to the Sections to which they belong would save the time of this Section.

The second recommendation, and afterward the third recommendation, was adopted.

The last recommendation, relating to the preparation of a list of queries, was read.

Mr. Ebert stated that the officers of the Section would have to attend to this, as in the past it had been done by the Committee on Papers and Queries.

Mr. Hallberg moved as a substitute that every member be requested to send a query to the chairman.

The motion was carried, and the report of the Committee as amended was then adopted as a whole.

There being no further business, the Section on Scientific Papers adjourned.

H. M. WHELPLEY, *Secretary*,
W. L. DEWOODY, *Secretary pro tem.*

MINUTES

OF THE

SECTION ON PHARMACEUTICAL EDUCATION.

THURSDAY AFTERNOON, JUNE 27.

The Chairman of the Section, Mr. P. W. Bedford, called the session to order at 2:30 o'clock. In the absence of the Secretary and of the third member of the Committee, Mr. A. B. Stevens was appointed temporary Secretary.

The Chairman read the following address:

To the Members of the American Pharmaceutical Association—Section on Pharmaceutical Education:

As Chairman of this important Section, it becomes my duty to address you on the opening of this session, and as the time allotted is but brief, I shall make my remarks correspond to this measure.

You are to hear from the two members of the Committee with whom I am associated, and so, though absent, they give you their best judgment on several topics which belong to this departmeut, and another committee is to report on the subject of preliminary education. This covers a large part of the field that would come properly under the report of your Chairman, but there is still room for what I have to say without trenching upon the latter committee.

There is no need of any argument as to the *necessity* of pharmaceutical education, for the very growth during the past 69 years from a single college of pharmacy to the present time, when we number 20 colleges and 12 schools of pharmacy, located in 17 of the States, the District of Columbia, and in Canada, settles that question. Legislation, too, has shown its necessity, for no less than 33 of the States and the District of Columbia have pharmacy laws, leaving only the states of Vermont, Maryland, Indiana, Mississippi, Arkansas, Tennessee, California, Oregon, and Nevada, and the Territories of Arizona, Montana, Utah, Washington, and the Indian Territory, with Alaska (15 in all), without these necessary aids to civilization. Maryland has a local law for the city of Baltimore.

The banding together of the better members of our fraternity in associations, State as well as National, has led to the formation of laws to protect the public, and this means better education of the pharmacist. In fact, the tendency of the times demands it, and all trades and professions find that success is more easily attained as the applicant is the better fitted by education in the line he purposes to make his life business.

Of the pharmacists who have *graduated* from colleges and schools of pharmacy there are to-day about 4,000 in our ranks (this may possibly be an underestimate) while it is safe

to say that there are about 2,000 more who have attended instruction for one or more terms, but did not apply for or secure the title of graduate. In our broad land there are probably to-day 38,000 stores where medicines are sold or dispensed. In these stores there are fully 75,000 or more persons who handle, sell, or dispense drugs as medicines. In follows, therefore, that not more than one in a baker's dozen has at any time had the instruction which in these days we look upon as desirable.

During the past year there was reported by the several pharmaceutical colleges and schools a total attendance of about 2,700 persons—certainly not more than one-tenth of those who should be receiving definite instruction in pharmacy. There has as yet been no means devised that can supplant the method of systematic instruction in the lecture room and laboratory under the eye and direction of one or more skilled instructors. Simple reading never will be the kind of information that is usually retained, and the oral words of the instructor must be supplemented by experiment, illustration or specimen, if the pupil would become proficient or have the facts fixed in his mind. It is just here that the various institutions for pharmaceutical education furnish their beneficent work and supply the needed material to the seekers after such knowledge. With their lecturers, instructors, laboratories, museums, they bring together that which the student cannot otherwise procure, and for which the expense to him is but trifling compared to the great benefit he may derive if he will. Our educational institutions being then the best source of value to the young pharmacist of our land, every effort should be made to secure the presence of the largest number possible, both in the interest of the pharmacists of to day and the pharmacists of the future. An unselfish motive is hard to urge upon a naturally selfish mortality, but I have yet to find a reasonable pharmacist who himself was a graduate who would not put himself to some inconvenience to have an assistant *who was worthy* to enjoy the same or better privileges than was his own good fortune in his younger days. I will admit that in these latter years, when the curriculum of our colleges has been so modified that more time and energy are now required by them, that there are those who do not care to give the number of hours away that seems to be needed, but "where there is a will there is a way," and the way is found when the *will* is of the right kind.

There are a few points of special moment I desire to place before those in attendance, and while they have been frequently dwelt upon in pharmaceutical literature, they are properly subjects for your consideration.

1. What is the duty of the fraternity towards our educational institutions?

2. What suggestions can be advanced to better the methods of teaching that at present are employed?

3. What can be done to secure more interest in and larger classes for educational advantages?

Briefly to reply to the first query, let me say that the "rank and file" of our fraternity do not seem to be in full accord with our colleges and schools of pharmacy. This is not surprising when we consider that not more than one tenth of the proprietors are either graduates or have been students in these institutions. But the good feeling that has been engendered by our State and National Associations among the many of our fraternity has been one source of aid to education; and could we but gather into these bodies the majority in lieu of the minority, we should do far more towards solving not only the question of education, but of our daily living. From these centers should radiate the strongest influences in behalf of pharmaceutical education, and it is really here that the work should be warmly advocated and befriended. The graduates of our colleges and schools, other things being equal, deserve the preference with employers, and I am glad to say, generally receive it.

To the second inquiry I am rather the one who seeks the information, and there are

others here who like myself would prefer to hear the expressions of those who are able to comment on methods now employed, and perhaps by observation, can suggest where faults may be remedied and improvements made.

To the third inquiry the reply to the first is a partial answer, and your suggestions on the second may add valuable information. I take it that we are all here for one common purpose—to advance such things as will perpetuate and stimulate a better education in pharmacy. In view of this it should be the duty of every one, as opportunity offers, directly and indirectly, to urge that young men brought into the business should not be retained in it unless they have a reasonably good education, so readily had in our fair land "without money and without price," though it is a priceless gift, and when worthy, they should be urged and aided in the matter of acquiring a pharmaceutical education. Aid them in your stores by those easily procured helps—books—give them time to study, digest and experiment—and in this wise division of labor at the counter and study, both theoretical and practical, you will be yourself the gainer. And when the right time comes, aid them in going to a college or school of pharmacy.

Among the hundreds of students that have come under my observation, there are many whom I recall with great pleasure, as they are now not only ornaments of our profession, but have made their mark in the world. Think you that many employers look back with regrets when they see the bright present that is the possession of some worthy clerk they brought up, and feel assured that the future of his business career will be an honor?

But I must not theorize—I have not done so. What we can do should be done cheerfully in behalf of a vocation that has by the researches of some of our members and associates helped to develop the materials that prolong life and mitigate suffering and pain.

Pharmaceutical education has done more in the past century to accomplish these desirable results to man than all the ages which have preceded it. Let us do what we can to develop the yet hidden mysteries of nature, that the future may be an improvement on the past, and that will be one of the results of the aid we ought to and can give by fostering pharmaceutical education.

A brief report of the Secretary was read, followed by a letter from Mr. Jacobs, of Georgia. The reception of the letter was strongly objected to by Messrs. Hallberg, Whitney, Manning, Kilmer, and Ebert, as improperly and unjustly reflecting on Boards of Pharmacy.

Mr. Searby read the following report:

REPORT OF THE COMMITTEE ON PRELIMINARY EXAMINATIONS.

To the American Pharmaceutical Association:

Your Committee find the task imposed upon them a very difficult one. In the terms of the resolution calling for their appointment, they are instructed to report "a standard for preliminary examination, which shall be recommended by this Association to all Colleges of Pharmacy as a requirement for entrance to the course of studies given in colleges and schools of pharmacy." An ideal standard would be higher than any of the teaching colleges would adopt, and a practical standard is not easy to determine. The foundations of a building are constructed with a view to their fitness for the superstructure that is to be erected upon them. They must be broad enough and strong enough to bear the weight of the perfected edifice. If the instruction to be received in our Colleges of Pharmacy is to be superficial, the educational foundations need not be

very substantial. But if the instruction is to be comprehensive, deep, thorough, the previous mental development must be correspondingly broad and liberal.

At this point, we are confronted with the question: What is the prime object of a College of Pharmacy? Is it for the purpose of conferring a degree as a mark of distinction on a limited number of bright and proficient students, whose abilities, or opportunities or superior industry have enabled them to rise above their fellows, or is it to elevate the rank and file of the apothecaries of the land, sending them out fairly proficient in their chosen calling and equipped for the battle of life? If we accept the former view, your Committee would at once recommend that nothing short of a certificate of having been graduated at a High School should be accepted from an applicant for admission to our colleges.

But we cannot regard our colleges as designed for the few; they are for the many. They seek to do the greatest good to the largest number. How shall this be accomplished? By making the instruction given of such exceeding value that all will desire to have it, and at the same time throwing open the doors of the Colleges to all who have a sufficient ground-work of mental attainments to give promise that they are likely to make satisfactory progress in their studies. If the terms of admission are too lax, many will enter who will be unable to profit adequately by the instruction given; if too stringent, some will be barred out who would make desirable students—some of the very class for whose benefit the Colleges were instituted. We must therefore adopt a middle course.

The necessity of raising the standard of qualification demanded for entrance to our Colleges has so often been insisted upon, that it is needless for us to reiterate it at this time. The question is, how can it be done? Due regard must be had on the one hand to the circumstances, pecuniary and otherwise, of the class of persons from which our students are derived, and on the other, to the quality and extent of the attainments expected of them at graduation. Obviously the finished product will be affected by the crude drug, and we cannot improve the quality of this by a stroke of the pen. However anxious, therefore, we may be to elevate the standard at our preliminary examinations, it must be done gradually. We can go no faster than those whom we take with us—the students. Large bodies move slowly. But though gradual, our progress must be none the less sure, or we shall fail to do the work expected of us.

It has been alleged that some of our colleges, having no income but what is derived from the fees paid by students, cannot afford to exclude applicants whose early education has been neglected. This consideration has no weight with your Committee. A college that panders to the popular demand for a low grade of qualification because of its financial needs, has no right to live. The question that most concerns us now is not how shall colleges be sustained? but, how shall they accomplish the beneficent ends for which they are designed? How shall we induce our young men to rise to the level of their opportunities, and fit themselves for their own further development?

The difficulties are great. So many youths get into the drug business without any fixed purpose of pursuing it for life. So many enter it having no proper conception of the intellectual capacity and mental training necessary to make them competent pharmacists. Still others drift into it from sheer listlessness, and various other causes. Some of these, after two, three or four years of mental indolence, conclude they would like to have a diploma, and so apply for matriculation. Only a few can be culled out of the classes named as having a fair prospect of succeeding in their studies. What becomes of the rest? If it were possible to induce them either to forsake the drug business altogether, or to qualify themselves for entrance into our colleges, where they would receive systematic, theoretical and practical instruction, it would be a great gain to our craft as well as to themselves. Your Committee believe this Association can do something that shall help to bring about an improvement in this matter. The evil is not confined to

the young men. Our drug-store proprietors are largely responsible. Apprentices or learners are too often taken into stores without sufficient inquiry into their scholarship. This ought not to be. If apothecaries generally should refuse to receive into their employ boys whose education is deficient, parents and guardians would soon learn that they must keep their boys in school until they have received a fair general education, if they wish them to follow the drug business. Your Committee consider this a vital matter, and one that lies at the bottom of the whole question.

The educational qualification exacted of apprentices or beginners is closely allied to those required for admission to our colleges. Members of this Association can give most important aid to the colleges, which, we believe, are all trying to raise the standard of scholarship demanded of matriculants. Indeed, it is much easier to exact conditions of would-be apprentices before they engage in the business at all, than it is after they have devoted several years to it and then conclude to make up for lost time by going to college. If we can have a united action on the part of apothecaries in this particular, and a like concert on the part of the colleges in raising their demands, it will be possible, at no very distant day, to require of all who aspire to enter a College of Pharmacy a much higher grade of qualification than is now feasible.

In view of all the difficulties that surround the question when we look for a practical remedy for existing evils, your Committee suggest:

1. That this Association recommend to its members, and all others in the retail drug business, to refuse to take into their employ as apprentices or learners, any boys or young men who have not been graduated from a grammar school of their respective States, or who do not present evidence of having received an education equal to that required for such graduation.

2. That Colleges of Pharmacy demand, as a condition to entrance upon their courses of instruction, a certificate of graduation from a State Grammar School, or from an institution whose course of instruction is known to them to equal that of the State Grammar Schools, and whose requirements for graduation are not less stringent.

3. That, irrespective of the possession of a diploma from a grammar school, all applicants be examined in the following branches: English composition, percentage, proportion, and rudimentary Latin.

(This recommendation is made because of the differences in the courses of instruction in the public schools in different States, and in view of the fact that experience has taught us that many of the candidates have left school for some years, and forgotten what they had only imperfectly learned.)

4. In the absence of such grammar school diploma, the preliminary examinations should embrace:

a. A thorough examination in the English language, including orthography (chirography), use of capital letters, punctuation, grammatical construction, etc.

b. Mathematics: common and decimal fractions, percentage, proportion, involution and evolution, and denominate numbers.

c. Geography and rudimentary Latin.

5. That all Colleges announce that in the year 1891 they will require the candidates to pass an examination in algebra, in addition to the foregoing.

Respectfully submitted,

W. M. SEARBY,
JOHN M. MAISCH,
A. B. STEVENS.

On motion of Mr. Whitney, seconded by Mr. Hallberg, the report was accepted and referred for publication.

MR. CALVERT.—I am very glad to find that our Committee that has just reported has

fallen into what we here in California consider very easy lines. We have been endeavoring here for several years past, as those who have followed the reports of our college here will very well know, to get at a method by which we could raise the standard of education of the young men who enter the college. In the first place, we have insisted for several years on a matriculation examination—not a very hard examination, but one which will indicate a fair average common school education. We have allowed those to come in for several years past, who had passed the examination of the grammar schools of this State. All those who had not passed that examination, or an examination equivalent to it, were required to pass an examination in four or five subjects—arithmetic, reading and writing, geography, and one or two minor subjects. We have found this rule to work remarkably well, and it has raised the standard of our students in a wonderful degree. We have been quite astonished at the advance which we have made in the last four years in the quality of the students in the college, and it is a thing which we think should be followed up by all the colleges in the country. I think that the idea which has been put before you now in this report of the Committee carries out essentially all that we have been striving for for a number of years.

MR. WHITNEY.—I consider it one of the best practical papers I have ever heard read, and in the line of progress.

MR. HALLBERG.—I cannot express my gratification at the report presented to this Association, so full of good meat and food for reflection.

A paper (printed) entitled, "Reply to Queries proposed at the Detroit Meeting," was called up by the Chairman to be read.

MR. EBERT.—I move that this paper be not published; I do not think the Proceedings of the American Pharmaceutical Association should be taken up with such queries and answers. They are well enough to bring up before this Section: let us read and study them; but to fill up the Proceedings with such matter is a mistake. As an illustration, here is an answer: "I think not; means too much machinery." This is all well enough to write in a letter as an answer; but I am quite sure that the member whose initials are connected with it would not like to see it in type. I certainly would not like to see mine published. I, therefore, move you, Mr. Chairman, that a printed copy be furnished to the members present to take home with them and read.

A motion was made and seconded, that the paper be accepted and referred to the Committee on Publication with power.

MR. WHITNEY.—I think the Association better take the responsibility upon themselves. We would be throwing a responsibility upon that Committee that the Association should dispose of. We are assembled for the purpose of considering these matters, and I am inclined to think with Mr. Ebert, of Chicago, that a good deal of it is poor timber.

MR. MAISCH.—I am very glad that Mr. Whitney has made these remarks. It is well known that the Permanent Secretary of the Association is necessarily always a member of the Committee on Publication. That Committee has as yet not been appointed, but will be appointed for the coming year as soon as the new Council shall organize. Who that Committee will be, consequently, I don't know; but I wish to say that in the past similar matters were referred to the Committee on Publication, and that Committee very gracefully usually got out of all trouble by reference to the Permanent Secretary, so that he was the only one responsible. I have repeatedly spoken against such a practice, and

I am very glad and very much obliged for Mr. Whitney to have made those remarks. I certainly think it is far more dignified for the Association itself to assume any responsibility that may be connected with it.

Mr. Searby.—When we refer a paper to that Committee, it is not with the object of permitting them to throw it out. I don't think they should have the right to throw out a paper that has been referred to them.

Mr. Maisch.—Yes, sir; the By-laws provide for that.*

Mr. Painter.—I move an amendment that this paper be laid on the table.

The amendment was duly seconded and carried, and the motion as amended was adopted.

A paper by Mr. Bodemann, entitled, "What is the present condition of the apprentice system?" was read, and, on motion, laid on the table.

Mr. Searby read the following paper, which, on motion, was referred to the Committee on Publication:

ON THE COLLEGE TRAINING OF STUDENTS IN PHARMACY.

Query 52.—Is the College training in Pharmacy, after two years' practical experience, better for the student than the reverse, viz., Theoretical first and Practical afterwards?

BY JOSEPH P. REMINGTON.

The query which the committee have propounded is a timely and important one. Formerly the almost universal practice was for a preceptor to engage an assistant with the understanding that he was to remain actively engaged in the store for at least four years; then, after usually two years' experience, the assistant was sent to a College of Pharmacy to attend his first course of lectures, and then, after another course, if his requirements as to age and experience enabled him to apply for the final examination in the Spring, he came forward and, if successful at this last test, he graduated. The query is timely, because a different practice is coming into vogue to a slight extent, and is sometimes recommended, and it certainly would be well to scan closely what might be called an innovation upon the time-honored practice.

So far as the writer's knowledge extends, no College of Pharmacy has ever passed a by-law or resolution which aimed to control the choice of the student or preceptor in this matter; there has never been anything to prevent a student from entering a college at any period of his service, and taking the regular course, (provided he passed the preliminary examination as to his ordinary education); he was never asked any questions about the length of time that he had been in business before entering college—so that the habit of not matriculating at college until two or more years of practical experience in the drug business had its origin entirely outside of direct college legislation, yet indirectly, certain pro-

*Chapt. VI., Art. IX. states that the Proceedings "shall contain . . . . such addresses, scientific papers . . . . as they (the Council) may deem worthy of insertion."

visions in the requirements for graduation had an important bearing in establishing the practice; these were adopted by nearly every college in the country, and provided first, that each student before receiving his diploma must produce evidence of having served four years in the drug business; and secondly, that every graduate must have attained the age of twenty-one years. Preceptors and students, knowing of these requirements, naturally reasoned that it would be better to concentrate the greatest amount of study upon the last two years of the four, because the last year was the period when the final examinations took place, and it was reasonable to believe that the first or junior examination should precede the final or senior examination by as short a time as possible, because study and the acquisition of theoretical knowledge is much facilitated by being carried on continuously and without intermission. It will thus be seen that the practice of entering college after first having two years' experience in a store was rational and based on good judgment. In addition to this, the courses of instruction at all colleges of pharmacy, presuppose some practical familiarity and knowledge of the objects used to illustrate the lectures on pharmacy. It is perhaps needless to say that the instruction would be much more likely to fasten itself in the memory of the hearer, if he had the advantage of some previous actual knowledge of the operation, or of the physical properties of the chemical or pharmaceutical preparation that is the subject of the lecture.

Then again, the custom of first acquiring some practical experience before entering college, was aided by the fact that the diploma was not granted until the candidate had reached the age of twenty-one years, and it was not only rational, but in most cases obligatory on the part of students, to acquire practical experience at first; for the great majority entered the drug business at about their seventeenth year, and it became necessary to occupy their time to the best advantage; and during the preliminary experience in the store they had the opportunity of carefully investigating the subject of college work, and of consulting with their preceptors and with the older students as to the best method of preparing for college. In some cases of exceptional ability it has happened that enough money has been saved by the student during the previous experience to pay his college expenses; and there are many graduates in successful practice to-day, who have reached eminence in their profession, who were compelled by straitened circumstances early in their career, to earn the means which paid for their education at college.

The query asks whether a previous "experience is better for the student," and by inference it would be supposed that the pecuniary question of "ways and means" was not a factor; for the few who are so favored that they *can afford* to take their college training at the beginning of their four-year term of service, and wait two years before passing their final examination (for of course they can not come into the exami-

nation room until they have produced evidence of having at least three and one-half years' experience in a store), there still remains the question—which is better? The writer is willing to grant that there may be an exceptional case here and there which would require special consideration, and the ultimate object of the student might not be the usual one, that of becoming a retail pharmacist. In all of the older colleges of pharmacy, there are constantly increasing numbers of students, who graduate, or take the instruction, who never expect to be apothecaries, but will enter wholesale or manufacturing departments, or become chemists, physicians or professional men in some of the collateral sciences; in such cases the probable career of the student must be taken into account. But it is usually safe to say that two years' training in a retail drug store at the beginning, with the varied experience that it affords, the opportunities to become familiar with the physical properties of chemicals, galenicals and medicines in common use, give to all an education that is lasting in its effects, and of inestimable value all through life. If the student should be so fortunate as to secure a good, conscientious preceptor, there should be no hesitation whatever as to the course to pursue. In conclusion, the query is answered by stating that, in the writer's opinion, it is better for the student to have practical experience before entering college, better for the professors (because of the greater intelligence of the students), better for the college (because it makes better students), and better for the community (for the same reason).

MR. STEVENS.—From the manner in which the paper has been received, I don't know but what I stand somewhat alone in my ideas in regard to this subject. I would like to call your attention to a few points. You notice that four years are given as the time required before entering the college, and then two years for graduating, making six years. Take six years from twenty-one years, the graduating age, and we have about fifteen years for entering the business. The preliminary education which you have all upheld so highly here must be acquired in the first fifteen years, according to this paper. Now, taking up a point as to the continuous study, I claim that the pupil should go directly on with his studies when he is able to comprehend the course laid out for him, and not after he has washed bottles for a few years and has got all through the notion of study. I can refer you to a man who had had sixteen years of experience, I think, a Secretary of one of the State Associations, a man apparently naturally bright to all intents and purposes, who when he came into the school-room could not hold his own with any of the students, even the poorest one in the whole class, and finally he dropped out and said he could not grasp those ideas. From the class for the last three or four years, take those students who have had no experience in the apothecary shop, and put them by the side of those who have had years of practical experience—I tell you that those who have no practical experience as a whole make better students in the end, their work being finished in better condition. Those standing the highest in every branch of study, have been those who have never seen the inside of a drug store to do a day's work. Such points are sufficient to prove that a man is in better condition to enter college when he is studying than after he goes off and neglects his studies for four years. There is another point; they speak of allowing the students to take their course of study through the two years, and then withhold their diploma until they have had the practical exper-

ience. I have in mind a young man who came to the University of Michigan, and brought a recommendation from his previous teacher of pharmacy. They did not graduate him, but they stated he had been through all the requirements of the school, except that he had not had the required number of years of experience, and that he was one of the best in the school. That proves the point I spoke of before. A remark has been made by some one that we should graduate them as graduates in pharmacy, that is, that, they should be competent and have all the practical experience, or withhold their diploma for four years, until they have that experience. Take the medical profession. Do they require them to become physicians before they graduate them? Or a mining engineer, or any thing of that sort? I think you will find we stand alone to-day on that point. There is another point in regard to their becoming familiar with drugs, galenical preparations, and the handling of chemicals. There was a young man who had nine years' experience, three years in the retail business and six years in the wholesale business putting up packages, etc. He came to the University, and wanted to know if we would give him credit for a certain amount of work he had done. We told him if he passed the examination, that was what was required. He went to the room and said he would try the examination, and after answering two or three questions he said he guessed he would come into the class; he came in until the whole course was finished, and then he passed an excellent examination.

MR. MANNING.—I suppose it is proper that there should be a difference of opinion upon a matter like this, but it seems to me correct that at this time the experience of our Board should be cited as replying to the gentleman's remarks. A party came before our Board with a diploma from a college of pharmacy that does not require a preparatory training in a drug store. This party passed a most excellent examination in the theory, everything was correct; but he could not recognize the difference between paregoric and tincture of opium, neither did he know that there was any difference in the dose; still, by registration upon the diploma that he held he had the advantage of equal standing with the oldest and best druggists in our state. It seems to me you might as well claim that a person could become a perfectly trained and skilled mechanic without having had any experience at the bench.

MR. HALLBERG.—Mr. Stevens is mistaken in the time required for graduation. The requirement of four years includes the two years at college, and the young man may commence the drug business at seventeen years of age. What he don't know about English and rudimentary Latin by that time, he will probably never find out. I think that most young men get most of their education by the time they are fifteen; at least most of them will be turned out to hustle for themselves by that time. Reference was made by Mr. Stevens to a man who had been in the drug business for sixteen years. That man never served a regular apprenticeship; he was simply engaged in a wholesale drug house, and he was a man unfortunately with very little, if any, education; hence this is not a good practical case. Now, I would like to ask, what kind of men do we want as assistants in the pharmacy? Do we want men who can write formulas, and scarcely know how to wash out the sediments in a lime-water bottle? I tell you, young men by the time they have spent two or three years at the college or school of pharmacy and have a diploma, are, as a rule, a little too high-strung to start right down on the lowest rung of the ladder, washing bottles, sweeping out, if necessary, which it is necessary for a man to know in order to master the drug business in all its details. That is the chief difficulty. Can you put such a young man in the store and have him do the work that is required of a clerk? Not at all. The representations made by Prof. Remington in his paper come nearer the point. Young men knowing nothing about tinctures, extracts, or fluid extracts, what good is a course of lectures in pharmacy to

them? Even the experience they get in the pharmaceutical laboratory in any institution in this country is not adequate enough to equal the practical experience obtained in the drug store. I think it is absolutely necessary that the practical experience should be had first, and the theoretical afterwards. The best results of education are only obtained when the person is placed in a position where he can recognize in what particular the education is going to do him the most good. Take a young man who has been two or three years in the drug business. He has tried his hand at making tinctures and other preparations; he feels there is something in which he is lacking; he can do pretty well, but his preceptor is not the kind of a man to give him the right kind of advice, and he feels half of the time at sea. Then he is ready for pharmaceutical education, and not till that time. Human nature is so constituted that it does not appreciate things until forced into the necessity, and on that ground alone, which is the underlying idea of all really good, sound education, this practical work should first be had before we have the theoretical.

MR. RAMSPERGER.—We know that the students turned out of our colleges do not have enough practical training, and therefore I agree with all that Mr. Hallberg says. Of course the theoretical must not be neglected, but the practical must go before it.

MR. STEVENS.—I have had experience with students who I thought had practical experience, but on questioning them I found that their experience was very limited, and many of them did not know anything about the little points that they ought to know if they had any experience at all in drug stores. I don't care what you say to the contrary, if you take those students who have had experience in drug stores, and place them alongside of those who have not had a day's practical experience, in the majority of cases you will find out that the students who had no practical education will turn out the better preparations. I don't know whether it is because those who have had practical experience have learned a slip-shod sort of half way of doing things, but I know that those with the theoretical experience turn out the best work.

MR. MAISCH.—It may be proper in this connection to direct attention to what is customary in other countries. I believe that it will be acknowledged that throughout the continent of Europe, in every country, the manner of proceeding is simply this: the young man has to get his preliminary education first, which, however, is higher than is as a rule required here, and includes at least the rudiments of natural science; then he has to serve his apprenticeship; after serving his apprenticeship he serves as a clerk; and then he prepares at the school or university for his final examination.

MR. STEVENS.—We have no such system of apprenticeship here; if we did, it would be different.

MR. MAISCH.—We used to have a system of apprenticeship, but of course that has been changed.

MR. WHITNEY.—One point which the professor made was, that a boy direct from school was in a condition to study. I have been long in business, and met a great many boys, and the boys that came fresh from school could take the Dispensatory and other books which we use and keep up the study until they went to college. To illustrate my point: there was a gentleman who had a diploma as a physician and had twenty-five years' experience, and claimed twenty years as an apothecary, when asked from what sources we obtained cream of tartar, he said he did not know exactly, but he believed it was made in the laboratory. A graduate of a college of pharmacy also came before our Board orally; he had already passed his written examination, which was good; but

when he came to the practical test he did not know tincture of asafœtida from sherry wine.

MR. EBERT.—I fully concur with what Prof. Stevens says with regard to the value of training of the kind that they give at Ann Arbor. The only fault that I find with Ann Arbor—for it is the only one that I know of at present—is that after giving the young man this training they give him a diploma which impresses upon that young man that he is an apothecary—that he understands the trade of a pharmacist. He has got education which is very useful to him; he will make an excellent pharmacist if he can just be made to understand that now is the time for him to learn the art of pharmacy, which he has not acquired. He has got the theory, but he has not got the art, and to be a pharmacist it is required in this country and every other country to have both theory and art.

The following paper was read by title and referred to the Committee on Publication:

WHAT KIND OF TRAINING IN LATIN IS BEST SUITED TO THE PHARMACEUTICAL STUDENT.

BY PROF. L. E. SAYRE.

Department of Pharmacy, University of Kansas.

Last year I had the honor of presenting to this Section of the Association a paper, entitled "The Advantages of a Training in English as a Part of a Pharmaceutical Education." Both that paper and this may appear to bring forward educational matters that are outside of the mere technical training required in a regular pharmaceutical course. From some criticisms of my former paper, I should infer that my critics considered such matters not only almost irrelevant to a technical course, but even unimportant or of little value to the pharmacist in his business life. I do not think it necessary to defend the contrary position before the members of this Section, since the very existence of the Section, I take it, implies not a circumscribed and restricted technical training of the pharmacist, but recognizes the importance of mental development and culture of the young man who is to be the future pharmacist. A broader and deeper education in all departments, even in mere mechanical work, is one of the general requirements of the day. Presumably every father says to his son: "I wish you to be better equipped for the business of life than I have been."

The study of Latin in our schools, aside from its historical and literary use, is looked upon as a means of mental development by strengthening the memory, exercising the judgment, and improving the student's taste and power of expression. No one will deny that the student of pharmacy has need of all these qualifications; indeed, that they are essential to the success of every business man. Nay, more: we may add that the professional and the scientific man feels himself weak without the training which such study gives.

Latin is especially necessary in the medical and pharmaceutical professions. A recent writer uses the following language, which bears upon

this point: "The Latin language is so generally employed over the world for prescription writing that it is very desirable that every pharmacist and physician should have at least an elementary knowledge of this language, and it is to be hoped that the time is not far in the future when such knowledge will be one of the fundamental requirements for an admission to an apprenticeship in a drug store or a physician's office." The prevailing opinion seems to be among educators that it is perfectly feasible to exact of the apprentice that he be prepared in such language-work as the Latin before he enters a school of pharmacy, if not before he enters the duties of an apprentice; but I have been convinced that this is not the case and will not be for years to come.

A knowledge of Latin being considered at least desirable, the question is pertinent, What kind of training is best suited to the pharmaceutical student?

It is the purpose of this paper to call attention to the question itself rather than to offer an answer to it. The question has forcibly presented itself to me since my connection with the Kansas State University. It is exceedingly to be regretted that so few students come to us prepared with any previous knowledge of this language, and many who have had previous training are insufficiently equipped. It has become a settled conviction with us that we must, in the case of the students of pharmacy, prepare the preparatory Latin work especially for them. There are several things which have led us to that conclusion. One of the principal ones is that the pharmacy students do not make the progress that they should in this study, because they fail to become interested and fail to see the connection between Cæsar's "Commentaries" and the Pharmacopœia. A technical student is interested—nay, even enthusiastic—in his own work, but to arouse and interest him in other lines of study requires a special effort. With this laudable purpose in view of arousing an interest in Latin in the minds of students in pharmacy, our Professor of Latin, D. H. Robinson, has prepared a series of exercises consisting of such words, phrases and sentences as are in common use in the practice of pharmacy and medicine. The sentences are practical, and the student can, at a glance, see the connection with his subject. When he knows the meaning of the words and phrases in actual use in his profession his interest is bespoken. I venture to add a brief selection from one of the exercises, that the members of this Section may have an idea of the plan:

1. Juvenis medicamentarius novam officinam recentibus medicamentis replevit.	1. The young druggist has stocked his new store with fresh medicines.
2. Ordines longi ampullarum vitrearum in abacis stant.	2. Long rows of glass jars stand on his shelves.
3. Dominus medicamenta inspectans et ordinans est superbus et beatus vir.	3. The owner inspecting and arranging his drugs is a proud and happy man.
4. Adornavit officinam et nunc multos emptores expectat.	4. He has adorned his store and now expects many cusomers.

5. Emptor intrat et syrupos rogat.
6. Rogabasne syrupos? Vide, inspecta, gusta, si placet.
7. En aurantii florum syrupus, calcii lactophosphatis syrupus, ferri et quiniæ et strychniæ phosphatum syrupus, rosæ syrupus, picis syrupus, rhei syrupus, et ceteri syrupi in ordine longo! Nonne sunt pulchri?
8. Tincturas quoque inspecta. Omnis tinctura est recens, eximia, singularis.
9. Tincturas arnicæ florum, benzoini, calendulæ, cubebæ, digitalis, gelsemii, iodii—omnes tincturas officinales habeo. Quam pulchræ sunt! Quot emes?
10. Trochiscos quoque gusta, et puero parvo da unum. Nonne sunt boni?
11. Omnia genera trochiscorum officinalium in ampullis sunt.
12. Nonne menthæ piperitæ et zingiberis trochisci linguam mordent, mi puer parve? Recentes et acres sunt.
13. Medicatas aquas etiam gusta; exampulla pota. Unquamme tales aquas antea gustavisti?
14. Aquas ammoniæ. amygdalæ, anisi, aurantii florum, chlori, menthæ piperitæ, menthæ viridis, rosæ—omne genus medicatarum aquarum præbebo.
15. Satis hodie, mi amice. Officina tua perpulchra est. Alio tempore cetera medicamenta inspectabo. Vale.

5. A customer enters and calls for syrups.
6. Did you ask for syrups? See, inspect, taste, if you please.
7. See there! Syrup of orange flowers, lactophosphate of calcium syrup, syrup of phosphates of iron, quinine and strychnine, tar syrup, rose syrup, syrup of rhubarb, and the rest of the syrups in a long row! Aren't they beautiful?
8. Inspect my tinctures also. Every tincture is fresh, superior and remarkable.
9. I have tinctures of arnica flowers, benzoin, calendula, cubebs, digitalis, gelsemium, iodine—all of the officinal tinctures. How beautiful they are! How many will you buy?
10. Taste my troches, too, and give one to your little boy. Good, aren't they?
11. All kinds of officinal troches are in my jars.
12. The troches of peppermint and ginger bite your tongue, do they not, my little boy? They are fresh and sharp.
13. Taste my medicated waters also; drink out of the bottle. Did you ever taste such waters before?
14. I will furnish you waters of ammonia, almonds, anise, orange flowers, chlorine, peppermint, spearmint, rose—every sort of medicated waters.
15. Enough to day, my friend. Your store is very beautiful. At another time I will inspect the rest of your drugs. Good bye.

QUESTIONS TO BE ANSWERED IN LATIN.

1. Estne medicamentario copia medicamentorum?
2. Habetne cubebæ et calendulæ fluida extracta?
3. Quis chiragram nodosam habet?
4. Nonne est chiragra morbus dolorosus?
5. Ubi sedes morbi est?
6. Nonne est in digitis?
7. Num podagram quoque miles vetus habet?
8. Quod remedium chiragram sanabit?
9. Nonne est salicylicum acidum podagræ novum et bonum remedium?
10. Estne dosis magna?
11. Decem grana est satis.

1. Has the druggist plenty of medicines?
2. Has he the fluid extracts of cubeb and calendula?
3. Who has the knotty gout?
4. Is not the gout a painful disease?
5. Where is the seat of the disease?
6. Is it not in the fingers?
7. The old soldier has no gout in the feet also, has he?
8. What remedy will cure the gout?
9. Is not salicylic acid a new and good remedy for the gout?
10. Is the dose large?
11. Ten grains is enough.

It is, perhaps, needless to say that the above exercise is one of the early ones in the course, and that as the student advances and his vocabulary enlarges, he is enabled to translate, finally, Latin medical authors such as Celsus. Now, this kind of training not only furnishes the ability to read Latin, but (what is more important to the student in pharmacy) it gives a more satisfactory and deeper meaning of words used in scientific nomenclature and pharmaceutical literature. Added to this is the advantage which usually attend the study, namely, a more extensive English vocabulary, which becomes the permanent property of the student.

It may appear to be a bold statement, but I believe that such a special training as is necessary in the Latin language for the pharmaceutical and medical student cannot be obtained from the high school course. Pharmaceutical students who are graduates of high schools and higher ones to whom these exercises have been submitted, say their work in Latin wanted tangibility, as it were, and this method seemed to put new life and a new meaning to the whole study. It is true there is nothing extraordinary about the method—it is only a use of different words and different expressions. But this difference, however slight, gives the tangibility we so much desire. It makes Latin, to the student in pharmacy, a living and useful language.

Nominations for officers of the Section were then made. Mr. P. W. Bedford was nominated for Chairman, and Mr. A. B. Stevens for Secretary; both nominees were elected by ballot.

Mr. Manning stated that a member of one of the State Pharmacy Boards had requested him to suggest that steps be taken to bring about a national standard of examination before the State Boards. After some discussion, the Chairman decided that the subject properly belongs before the Section on Legislation.

Mr. Hallberg stated that at the next session of the Association, he would move that the By-laws be changed so that the Sections on Education and Legislation be merged into one.

Mr. Maisch suggested that questions relating to the sphere of this Section be printed in a separate list.

Mr. Hallberg.—I think we should have some expression in this Section on the courses of instruction in the colleges as conducted at the present time. A number of colleges at the present time have two courses in the year. I think personally that will result in considerable harm. If no person would be allowed to come up for graduation who had taken the two terms in succession, then no particular harm would result; but I am afraid that such is not the case, and a young man is therefore enabled to graduate within one year by taking two succeeding courses of about five months each. I don't think this is fair or just to the other colleges who do not have that kind of instruction. I think that this Section should discuss that matter, and say something about it.

Mr. Runyon.—The remarks of Mr. Hallberg apply in a measure to the California

College of Pharmacy. A student can enter a course of lectures here in the spring and finish them in time to enter upon a winter's course in the East. I don't know of any particular harm that can arise from this, but the course carried out in some Eastern States, one college giving a course of lectures in the summer, and also in the winter, enables the student to graduate within seven or eight months' time. I think myself that this is too short. I would rather see the course extended to three years. I think this an important matter, whether the course of instruction should not be lengthened instead of shortened in order to graduate.

MR. MAISCH.—When does the California College close its lectures?

MR. RUNYON.—Our lectures close about the latter part of September or first of October. The student is enabled by absenting himself from the commencement exercises, which generally take place about the first of November, to arrive in the East, at Philadelphia, New York or Boston in time to enter the Senior course of lectures in those colleges. It has occurred in several instances within the past few years.

MR. MAISCH.—Do your Junior examinations take place in September?

MR. RUNYON.—Yes, sir.

MR. EBERT.—This is a very important question. If the Eastern Colleges would adopt the uniform rule of not admitting to the Senior course any student who has just passed the Junior examination of one of those colleges that have either two terms, or as the California College, which has its course in the summer, it would compel those grind-out mills, as you might style them, to stop—they would have no excuse. I refer especially to institutions that are located very close to my home. There is no use of mincing words in this matter—it is not education. If it is proper that there should be an intervening six months before entering upon the graduation course, we should compel these colleges, or should condemn them for doing that thing. We are here for the purpose of raising the standard of pharmacy. If anything is being done by either a member of this Association or anybody else to pull it down, let the facts be known. We certainly can assert ourselves in this work. The subject brought forward by Mr. Hallberg is a very important one, and it should be acted upon by this Section.

THE CHAIRMAN.—There is nothing to act upon as yet.

MR. SEARBY.—I would like to say, in connection with this matter, that it is not so much for us to say what we should like, but to look to the fruits, to the results of any action that we might take in this matter. The college that gives the best education, that most fully equips its graduates, sends them out best fitted to battle with the difficulties and problems that come before the pharmacist, that college is going to win. It makes no difference whether it has a continuous course of twelve months, or a two or three years' course split up into pieces—the one that does the best work will win. If our colleges do not come up to the requirements, and if our course of instruction is not what it ought to be, we will fall in the rear. As Prof. Runyon has said, we have been much more seriously inclined to make ours a three years' course than to do anything to shorten it. Almost every year we extend the course of our instruction as fast as our facilities and the condition of our students will permit, and we have seriously thought about making it a three years' course, because we don't believe in hurrying through. The students all want to get through, and get done going to school and get a diploma, but we must not listen to it. We do not listen to it. But we will see what the result would be in reply to Mr. Hallberg's suggestion. It is very undesirable that a person should go through his first course in one college, and rush off and get his second course at another college within a few

months, when the intention is that he should get some practical instruction in the interim. The question is: Is it better to keep up the instruction continuously for twelve consecutive months, or is it better to divide the time, with a period of rest and digestion? The colleges have thought that the plan that called for a period of rest and digestion was the best. I think so. Another man, or another college, may think differently. Let us look at the results before we are in haste to condemn any method of instruction.

THE CHAIRMAN.—I would suggest that though we might discuss this topic for some time longer, it should be treated upon in papers by some of those connected with the colleges. A series of queries will be prepared by the Secretary or myself, in the hope that they may draw out answers to be read at our next annual meeting.

No further business being brought before the Section, on motion, it adjourned.

MINUTES

OF THE

SECTION ON PHARMACEUTICAL LEGISLATION.

THURSDAY AFTERNOON, JUNE 27TH.

In the absence of the three members of the Committee on Legislation, the Section was called to order by Mr. Bedford, and a motion was made and adopted that Mr. Painter occupy the chair. Mr. Maisch volunteered to act as temporary Secretary of the Section.

The following communication from the Chairman of the Section was read:

To the Section on Legislation—American Pharmaceutical Association.

GENTLEMEN: With regret I find myself unable to be with you upon the occasion of your meeting on the Pacific Coast. I hope that the gathering may be of great pleasure to those who fortunately participate, and that your deliberations may be of pronounced and permanent benefit to the fraters throughout our country.

I presume the question of the fitness of members of Pharmacy Boards will be discussed by your body.

During an experience of eight years as a member of the Illinois Board of Pharmacy, it has been my privilege to meet a great many gentlemen who were serving the people in this capacity, in different States, and I have found them men of more than average ability in a general sense. It seems to have become quite the thing for some writers and speakers among our scientific pharmacists, to hold up Pharmacy Board appointees to derision and to characterize them as politicians, because of the posesssion of influence sufficient to command the attention of the appointing power. That this is true is unfortunate, because it tends to discourage a class of men who are ready and willing, often at great personal sacrifice, to perform the pioneer work necessary to secure to any State a pharmacy law. It seems to me that the labor performed by druggists all over the United States in this direction merits the hearty commendation of all persons pledged to the best interests of pharmacy. While the questions prepared by members of Pharmacy Boards may not take rank with scientific productions, they are, nevertheless, usually calculated to determine the fitness of the candidate for service in a retail drug store, and I am sure the average Licentiate in Pharmacy, of any Examining Board in the United States, will do the Board he represents no discredit. Again, attempts at wit or ridicule, at the expense of our fellow workers, are calculated to drive them from us, and by depriving us of valuable assistance, injure our own interests and retard our growth. It is to be hoped that our annual gatherings may result in a closer bond of union be-

tween men whose life work calls them into the line of our profession, and that the extent of scientific knowledge may not tend to the assumption in the possessor that he is thereby called upon to belittle the ability or wound the sensibilities of his less informed fellow.

The interchange of state certificates is the question of the hour, and your body should by all means formulate a plan whereby all Boards may be furnished an opportunity to agree upon this important matter. It seems to me that an experience of four years, actual experience in dispensing, in a retail drug store in the United States, and a first grade certificate from a Board of Pharmacy in this country, should entitle the holder to registration in any other state. It may be urged that some Boards are more stringent than others, but I incline to the opinion that examinations would be equalized by reason of the comment resulting from the advertisements in the persons of certificate holders. The whole matter of pharmacy legislation by sufferance of the persons regulated, is yet in the experimental stage. It seems too soon to expect an ideal law in this country, nor indeed do any of the large number of laws in this country seem to be in any considerable degree satisfactory. As you will be "with one accord, in one place," it is to be hoped that your deliberations will bring about satisfactory solutions to all the vexed questions that have arisen.

Yours in the best of bonds, CHAS. W. DAY,
Chairman.

Springfield, Illinois June 18th, 1889.

On motion, the address was received and referred for publication.

MR. MANNING.—I now desire to present the motion that was ruled out of order during the session of the last Section, and as I stated at that time, I desire the gentlemen to know that I make the motion at the request of a member who could not be with us at this meeting. His desire was in the line of the communication read by the Secretary, and he requested me to make this motion, that a committee be appointed to formulate a plan for bringing about a national uniformity in the standard of examinations before the state Boards of Pharmacy, and for leading to an interchange of state certificates. I wish to state that I am not in sympathy, however, with the motion, as I do not think it is practicable.

The motion was duly seconded.

MR. HALLBERG.—I am like Mr. Manning in this respect. This is not a uniform country; the people are different; the conditions of education and society are different; the requirements in New York, New England, Pennsylvania, should be considered ahead of the requirements west of the Missouri river, and for that matter west of the Alleghanies; it must be that way. If the laws are not drawn to correspond tolerably well with the conditions, you will have abnormal laws; and an abnormal law if prosecuted will only create difficulty, and if not prosecuted is worse than no law at all. A much better plan would be for us to start at the bottom, and then in the course of five or ten years we could possibly arrive at uniformity in legislation and uniformity in Pharmacy Board examinations. The apprenticeship is the starting point, and I am very sorry that no practical suggestion was made on apprenticeship at the previous session. I think we have got to do that first. I would like to say in a few words, that the only attempt made so far that has come to my knowledge was the suggestion made by Mr. Druehl, when President of the Illinois Pharmaceutical Association about three years ago, that the pharmacy law require every pharmacist employing a young man to file a statement with the Secretary of the Board of Pharmacy upon blanks furnished by the Secretary and filled

out by the employing druggist, giving the qualifications of the young man. That would give the druggist and the Board of Pharmacy a kind of a record as to the qualifications of the apprentices, and it would also be a record as to the length of time they had been serving in the business, which would be of great value when they subsequently come up for examination or enter a school of pharmacy. I think we ought to recall the apprenticeship system first, and after we get that fairly in hand, then try and get uniformity in the standard of examination.

MR. ALEXANDER.—I would like to ask Mr. Manning if his friend has formulated any plan as to how we are to get at this standard of uniformity. Is it proposed to have some central committee which shall issue all the questions that are to go before the different Boards of Pharmacy, or shall rate all the answers? It seems to me one of the most difficult questions to arrive at. For instance, what the Illinois Board of Pharmacy might consider a high standard, the State of New York might consider a low one; what the State of Missouri might consider a high standard, Ohio might consider a very low one. What I want to know is, how are we to arrive at this standard?

MR. MANNING.—This motion is made at the suggestion of Mr. Jamieson, of Chicago. His plan is this: that this Section choose a committee, that they prepare a list of questions for examination, to be sent to each one of the State Boards, that the copies of the examinations be returned to this Committee, and they to mark the averages, and that the expenses of this Committee shall be paid *pro rata* by each of the Boards who adopt this plan.

MR. WHITNEY.—I think this subject that has been introduced, although it may not be directly in answer to Query 46, yet the answer to that query bears upon this question. Still it seems to me it is hardly worth while to read the paper. As has been stated very clearly, the different States have different standards. It is the purpose in our State to make the standard fully up to and a little above the average, and to increase the standard year by year. For the little State of Massachusetts to hold up the same standard as Illinois, or as California, if you please, perhaps would hardly be just. In Rhode Island, a small State, a registered pharmacist came before our Board. Among the matters I put was: "I go into your store and tell you I am in great pain, I want a dose of opium: how much would you give me?" "Are you in the habit of taking opium?" I say, "That is for you to determine, sir; I don't want to discuss the matter. I want a dose of opium." "Eight grains." I told him he had better go back and prepare himself before presenting himself. I think the proposition made is solely in the interests of druggist brokers, and is not in the interest of pharmacy. I am opposed to anything beyond what the State itself requires, We may make all the legislation we please, yet we cannot compel any one State to adopt such legislation as we may ask for. Every state is doing the best it can, and the only reason why this question comes up is because a man who is selling desires to get men to come from one State to another. We had several cases pressed upon us.

The question being taken on Mr. Manning's motion it was lost, all present voting in the negative.

MR. EBERT.—I think we have gone a little too far in this country in legislation, and I simply bring it up so we may give it some thought. The remarks made by Mr. Whitney brought this matter to my mind. We have gone in this country, in pharmacy legislation, away beyond anything ever attempted before, at least as far as we have any record.

MR. SEARBY.—How about Germany?

MR. EBERT.—Germany not excepted. If we had taken a more practical view of this matter, as we ought to have done as practical men, we would not be quite in the dilemma we are in to-day. We have not only tried to manage and control pharmacy, and the men who own or manage drug stores, but we have tried to regulate, manage, and control the employes of the pharmacists. To be brief, we should enact laws that require an examination and qualification of the owner, proprietor or manager of the drug store, leaving to him solely the choice whom he wishes to employ. I know there are some selfish interests which would say that is not the best thing to do, but this legislating clerks, apprentices and everything else connected with us, has gone too far. Our whole system of business, of apprenticeship, and of education is not up to that standard, and we should not try to accomplish something which is not to our interest to do. We issue certificates of qualifications to clerks and to apprentices, which are equal in standard to that of the proprietor or manager of a store.

THE CHAIRMAN.—Should not they be so issued if they are equal in qualifications?

MR. EBERT.—I will show you where the difficulty comes in. Suppose I have a boy in my employ for two or three years, he comes up for examination and passes the State Board, and is then usually ready to start a drug store, and is in position to become a competitor of mine. That is just where our law goes too far, for this is certainly not desirable. If, on the other hand, the applicant for registration, before he can enter the drug business on his own account or manage for another person, is required to have a high standard of qualification, then you will not have drug stores springing up on every corner of the street. If we are giving the public qualifications, if we are doing anything for the protection of the public, we are entitled also when we invest our money, coupled with experience and intelligence, to be protected in some directions, which we are not now by these existing pharmacy laws. This does not embrace all the points in question, but it covers some at least to which I wish to call the attention of the members of the profession.

Mr. Maisch moved that two papers which had been sent to the Committee, in answer to Queries 46 and 47, be read by title and referred for publication.

MR. WHITNEY.—I doubt the propriety of printing Query 46. I think we voted on that subject and settled it, and it seems to me it is not wise to lumber up the reports with such nonsense. The fact is, Mr. Chairman and gentlemen, this is simply not the line of progress. We have had before us within the last two months a man who runs two stores. He was refused a druggist's license in Massachusetts. He came before us to see if it was possible for him to get a certificate. His answer to the question, How many grains in an avoirdupois ounce? was two hundred and twenty. How many in a troy ounce? One hundred and eighty. And that is about the sum and substance of his knowledge of the drug business; and if by any hook or crook he could get a certificate in one state, in the name of God don't accept it in another.

Mr. Maisch then moved that the paper on Query 47, "What should be the true aim of Boards of Pharmacy in their examinations, and how can it best be accomplished?" by Robert G. Eccles, M. D., be referred to the Committee on Publication, having been read by title. The motion was duly seconded and carried.

MR. HALLBERG.—In regard to Dr. Eccles' paper, I will say that I have watched the

examinations as conducted by the Boards of Pharmacy, and I am satisfied that some discriminate against the experienced competent man in the store in favor of the college graduate, and that will never be remedied until the State Boards of Pharmacy are in a position where they can add in addition to the regular written examinaton a modified oral examination if possible; but more particularly, and more important than anything else, a practical examination in dispensing in a carefully selected, not necessarily elaborate, practical dispensary. Put a candidate right at the dispensing counter and see his value in the store, how he can do his work; that is what we want to know; and I would like to emphasize that point.

MR. SEARBY.—If I understand the purport of Boards of Pharmacy, they are really for public safety. The public safety does not require that a man shall be a very expert chemist. That is for his own interest. The public safety requires that he shall be a safe pharmacist; that he shall understand what he is doing; that he shall not dispense poisons indiscriminately; that he shall understand the nature and the doses of medicines, and such matters. But outside of that the public has comparatively little interest. There is danger of Boards of Pharmacy going too far. We made that mistake here when we had a local Board. Some mistakes we made compelled us to submit to having our law repealed. We cannot run in the face of public sentiment altogether, and I think we ought to be careful about raising unnecessary difficulties in the way of persons who come before these Boards of Pharmacy. If they are safe so that the public are protected, that is all that a Board of Pharmacy is for, and I do not believe that the State Legislatures will recognize anything else. A man's ability to make his living is his own affair; his ability to be a useful clerk is his employer's affair; but the public at large have very little interest in that matter.

MR. WHITNEY.—What Prof. Searby said in regard to the Boards of Pharmacy being created for the people and in the interests of the people, is strictly true. If we attempt legislation otherwise than that, our pharmacy bills will be repealed just as sure as the sun shines. We must remember that these Boards of Pharmacy have been created in opposition almost to the republican form of government, and that it is almost special legislation. We must be exceedingly cautious how we move, if we want to grow and improve the apothecaries of this country.

EXAMINATIONS BY BOARDS OF PHARMACY.

QUERY 47.—What should be the true aim of Boards of Pharmacy in their examinations, and how can it be best accomplished?

BY ROBERT G. ECCLES, M. D.

"Public safety must be regarded as superior to any private rights, and his (the druggist's) business must yield to the necessities recognized by proper legislation." Such was the decision of Judge Brady, as concurred in by Judges Van Brunt and Macomber in the case of the People *vs.* Rontey, in the Supreme Court of the State of New York, January, 1889. Boards of Pharmacy and pharmaceutical laws are therefore pronounced constitutional, much to the delight of all progressive pharmacists. It is thus definitely settled that the public may be protected from the pranks of the incompetent, even if individuals must suffer who have invested capital in the business, but have not the proper knowledge to safely conduct it. The conditions of this decision, however, should be carefully

scanned by all who wish to see this vantage ground retained, and new steps of progress taken. The true aim of Boards of Pharmacy should be, in examinations and everything else, to work for public safety, and that only.

Æsop's fable of the boy and the nuts must be ever before them, in spirit at least, if they hope to accomplish anything. If, by over-zealousness, the effort is kept up of trying to elevate pharmacy, some Board is likely to, ere long, meet ignominious defeat. One blow of this kind in any State will throw back the good work a decade or more, not only there, but by sympathy elsewhere as well. If it can be shown that in their examinations they transcend their rights, no judge will sustain them. To blindly lose sight of this weak point is to court defeat. Let us consider an extreme or improbable case, to begin with. Suppose the Board of Pharmacy of New York should refuse to register men who could not pass a satisfactory examination in Chinese or Sanscrit literature; what would happen? Evidently trouble would be brewing soon, and either the law quickly repealed and the Board abolished, or an effort made to limit its scope so that useless knowledge could not be demanded. The first is most likely the mode of cure that would be insisted upon, and pharmacy thereby become the sufferer. To demand of applicants any kind of knowledge that cannot be shown as immediately necessary for the care of public health and life, is unconstitutional. Remote and indirect relationship will not answer. Boards of Pharmacy are not legalized to promote pharmaceutical education, however desirable such a consummation may be to all right-thinking men. Their questions should not be patterned after those of a college. There the amount of knowledge acquired by the student is what they want to know; here only the protection of the druggist's customers is sought. At first glance it would seem as if this would materially lighten the severity of examinations, but on deeper consideration it will be observed that no such consequences could follow.

The trend will be very materially altered when viewed from such a standpoint, but the questions may be quite as difficult. Instead of passing, as now, men with good memories but wretchedly bad judgments, it will reverse matters, and give us as pharmacists only those who have mastered practical facts and know how to use them. Nor will general pharmaceutical education suffer, for it will be found by the applicant that to answer well and understandingly a practical series of questions, their knowledge must be broad and profound. They must know how to detect adulterants in their goods, and how to identify every drug in their establishment. If a package of oxalic acid reaches them labeled Epsom salts, they must be able to see the blunder and correct it. If monobromated camphor crystals have an admixture of strychnine, they must be able to discover the error before some one is killed. If powdered bella-

donna root gets mixed with powdered senna, their knowledge must have taught them how to tell such an admixture. That physicians may not be thwarted in their efforts at healing the sick through getting their remedies stronger or weaker than they order, druggists must know how to make quantitative examinations of all officinal drugs. So long as tincture of nux vomica can be bought in two stores within a block of one another, where the extract in the one is far above pharmacopœial requirements and in the other far below, what benefit is medical aid to the sick requiring this remedy? In one of the largest cities in the country, a committee of physicians and druggists not long ago found this condition of things existing. In their report occurred the following words: "In this lot the strongest contained over fourteen times the amount of the weakest, or as 12 to 173, 100 being the standard. It took a dessertspoonful of the one to equal about ten minims of the other." Are such men not extremely dangerous to the public?

What are physicians to do if their most potent remedies from one store must be administered in dessertspoonful or tablespoonful doses, while in a contiguous one ten to twenty minims are adequate? This same committee sent out word to every druggist in the county that at a certain date their tincture of nux vomica was to be assayed and a report made thereon. Samples were asked for, and 106 out of 300 stores complied with the request. Those who did not send in any, on subsequent examination of a few of them, were found to average worse than those who did. Out of the 106 willing ones, only 46 passed after allowing a limit of ten per cent above and ten below the pharmacopœial requirements. Sixty of these Registered Pharmacists did not know enough to make tincture of nux vomica after they had been told how by the committee, notwithstanding the wide margin allowed for error. The committee on returning the report to the societies they represented, said: "It is evident that in spite of our efforts, there are still very many pharmacists in this county utterly ignorant of the requirements of the Pharmacopœia. In fact, the majority of them either have none, or refuse to read what it says after their attention has been pointedly called to the subject. They seem to think that if they try to secure a good drug and exhaust it with the commonly used menstruum, their work is done. Some even imagine that if they buy a good fluid extract they can dilute it and get a good enough tincture for them. This is not an inference from the results of these assays, but from the actual statements of a few who have been talked to upon the subject." The writer has, within a month of the present date, (May 1st, 1889), examined three samples from each of the following cities: New York, Philadelphia, Jersey City, Brooklyn, Newark, Providence, Albany and Boston. Out of the twenty-four only two were within a twenty per cent. limit correct. All the rest had either too much or too little extract. Sixteen of them

had an excess. No effort seems to be made anywhere at following the Pharmacopœia. Even tincture of iodine, that only requires the weighing and dissolving of a solid, has been found to vary within very wide limits, and less than sixty per cent. out of nearly one hundred samples examined were up to or near the standard. Sweet spirits of nitre seems to be universally kept in large bottles on the shelf during the warmest summer weather, and when administered is little better than a mixture of vinegar, alcohol and water. It is, however, unnecessary to single out any one of the many volatile remedies as an illustration. They all receive treatment that makes it impossible for prescriptions to be properly compounded in a very large number of stores. Goods deteriorated by age are used as freely as if they were of the best quality. Solid extracts burnt in the manufacture and rendered therapeutically inert, are dispensed as freely as if they were first-class in every particular.

A solid extract of nux vomica from a leading wholesale house was examined some time ago by the writer, in which the alkaloid was almost entirely destroyed by heat. From the batch probably many thousands of pills were made in various parts of the country, and yet it is quite likely that a couple of drams of the stuff might have been swallowed with impunity. Boards of Pharmacy should have the power, if not already in possession of it, to check these results of carelessness and ignorance. They are placed as guardians of the public safety and health in medical matters, and cannot be expected to execute their commission without the authority to check such reckless conduct. All their examinations should be conducted with the object of public care in view, so as to guard against the ignorant, but nothing short of an incessant surveillance of the products and methods of pharmacists can ever give proper safety to the community. When wilfulness and downright carelessness step in, what good is ability? Examinations cannot foresee the men that are going to dispose of goods at such rates as will necessitate their constant attendance upon customers behind the counter, to sell enough to pay expenses. Whatever their ability may be, they are dangerous. They have not the time and cannot afford to pay for the careful examination of the contents of every package before it is put into bottles or drawers. They should be watched and compelled to do their duty in this matter. They have no business to cut their profits to such a degree, at so fearful a cost. The people's safety is totally overlooked by them, and it should be some one's duty to force them to do the right. In the majority of instances these so-called cutters are not educated pharmacists, and are therefore not really aware of the enormity of their crime. They believe their goods to be as good as the best. They should be taught their error. No one can do it so effectually as the Board of Pharmacy. All examinations of applicants should be conducted in a manner to show whether or not they can tell the quality of what

they sell, and the strength of such as are bought in diluted form. They should be asked to give a demonstration of their ability in this direction. A sample of some article, such as dilute hydrocyanic acid, should be handed them, reagents supplied, and they asked to tell the amount of absolute acid in it. It would be just as easy for them to acquire this kind of knowledge as that they are now expected to have. Any intelligent young man can by diligent study learn to apply off-hand every test of the Pharmacopœia for the determination of the quality of officinal articles in less than two years. He cannot do this, however, if he has to cram himself with chemistry, botany, or microscopy where these sciences are only remotely related to such work. They should be able to answer correctly every question propounded regarding the proper conditions for the preservation of goods that deteriorate. They should know all positively dangerous incompatibles. They should know how to calculate and what are the maximum doses of all common poisonous remedies.

The present methods of rating adopted by the various Boards should be thoroughly revised. All questions are not of equal importance. There are many which can be asked, that a single blunder, not due to a slip of the tongue, excessive embarrassment, or misunderstanding, should count so thoroughly against an applicant that he could not at that time pass. There are others the missing of a majority of which should count but little against him. Between these extremes lie all degrees. Every answer should be rated according to the degree of its importance to the safety of the general public. As things are now conducted by some Boards, he who answers correctly a definite per cent. of the questions is permitted to pass, although he may think that atropine can be dispensed with safety in scruple doses, or that sixty drops of laudanum make a dram.

On motion of Mr. Bedford, seconded by Mr. Whitney, the paper in answer to Query 46 was laid upon the table.

The Secretary read the draft of a bill relating to naval apothecaries (see page 38), which had been referred to this Section by the Association; also the following letter:

U. S. R. S. "VERMONT," NAVY YARD, NEW YORK, *June 10th*, 1889.

To the Officers and Members of the American Pharmaceutical Association:

GENTLEMEN.—As the question of improving the condition of the apothecaries of the U. S. Navy is again being considered by the Association, I deem it expedient to advise its members of our present status. We are in the same category with masters-at arms, whose duties are of a nature requiring more muscle than brains, viz.: charge of prisoners, responsible for the cleanliness of deck, etc. Yeomen and writers are also representatives of our class. The former have charge of stores, save yeomen to paymasters, who serve out salt beef, pork, canned goods, and groceries generally. Writers are merely copyists. Machinists, boiler makers and blacksmiths were formerly under the same heading; but as they were looked upon as skilled laborers, they have been reclassified. Our pay is the same as that of the above-mentioned ratings—$60 per month, except that of machin-

ists and masters-at-arms. The former receive $10 and the latter $5 more monthly than we. They are enlisted men, and upon re enlisting within ninety (90) days after having been honorably discharged, receive three months' pay for the rating in which they were discharged, and an additional dollar per month for every consecutive enlistment. Apothcaries are appointed for the cruise by the surgeon, under whom they serve, subject to dismissal for misbehaviour in any port, foreign or otherwise. No increase of pay for long service, though I understand that the Surgeon-General has recommended $75 per month for those having ten years' service; but as tenure of office is so uncertain, I doubt if many will be benefited should the same be approved. My pay was $64 per month when I entered the service, in February, 1881, but has long since been "razed" to $60. Among other things, we frequently fail to get the consideration due us from our superiors; consequently few competent men remain in the service. The result is, many naval apothecaries are men selected by the surgeon from members of the crew, there being no examination required as to proficiency. In justice to the profession, I sincerely trust the Association will endeavor to ameliorate our condition at the earliest opportunity. It is my impression that if the individual members will either call upon or write their respective Representatives, setting forth our grievances, we will be justly dealt with. Thanking the members for their previous efforts in our behalf, and hoping we may ultimately be successful, I remain Fraternally yours,

CHAS. E. REYNOLDS,
Apoth. U. S. N.

On motion of Mr. Whitney, duly seconded, the Chairman and Secretary of this Section were authorized to memorialize Congress in favor of the bill.

MR. MAISCH.—Ever since the Committee on Legislation has been one of the standing committees of this Association, that is for very nearly twenty years, the Committee annually brought in a report containing the laws in relation to Pharmacy that had been enacted during the preceding year, together with a brief digest of the same. Since the Committee became the executive of a separate Section, that has been omitted. I don't know what value the members of the Association or of this Section place upon such a record. I must confess that I place a very high value upon the republicatiou of these laws in our Proceedings, because they are thus made readily accessible, and our Proceedings are very convenient for referring to and comparing these laws as enacted in the several states. I will therefore move that the Committee on Pharmaceutical Legislation to be appointed, be requested to incorporate into their report next year any laws relating to Pharmacy within the United States that have not heretofore been published in our proceedings.

MR. BEDFORD.—Would it not be very desirable that these laws be inserted in the next volume, without waiting for another year. These laws are easily accessible. Put them in now.

MR. SEARBY.—Not wait a year?

MR. MAISCH.—I accept the suggestion and will modify the motion, that the Committee on Legislation be requested to furnish to the Committee on Publication, for publication in the next Proceedings, such laws as have been passed, and have not been previously published.

THE CHAIRMAN.—Before putting the motion I would like to ask: is it not among the duties of this Committee to furnish such a report under our rules?

MR. MAISCH.—It is; but it has not been attended to.

The motion was duly seconded.

THE CHAIRMAN.—Would it not be well for the Secretary of the Section to communicate with that Committee, and request them to furnish that report, and we can authorize its publication when received.

MR. ALEXANDER.—That Committee passes out of existence with this meeting of the Association, and I think it would be a great deal better to leave the collecting of these laws to the new Committee.

MR. WHITNEY.—It takes just a postal card sent to the several bodies, and asking them for a copy. We should be very careful not to get in any old laws that have been repealed. In our state, section 3, I think it was, which provided that the Board should issue certificates of registration to those who had three years' practical experience, has been repealed, and no one can practice pharmacy now in the State of Massachusetts without passing the proper examination, no matter whether he is a graduate of all the colleges or has had a thousand years' experience.

The motion being put by the Chair was carried.

Nominations being now in order, Messrs. Whitney, Alexander and Ebert were nominated for Chairman, but declined. In view of the contemplated consolidation of this Section with the Section of Pharmaceutical Education, the chair suggested the advisability of electing the officers of that Section. Mr. P. W. Bedford was then elected Chairman, and Mr. A. B. Stevens, Secretary. The newly elected officers were conducted to their seats; and there being no further business presented, the Section adjourned.

JOHN M. MAISCH, *Secretary pro tem.*

PHARMACY LAWS.*

PHARMACY LAW OF FLORIDA.

An Act to Regulate the Practice of Pharmacy in Cities and Towns of more than two hundred inhabitants, and the Sale of Poisons, in the State of Florida, and to affix penalties.

Be it Enacted by the Legislature of the State of Florida:

SECTION 1. That from and after the passage of this act it shall be unlawful for any person not a registered pharmacist, within the meaning of this act, to conduct any pharmacy, drug store, apothecary shop or store located in any village, town or city in the State of Florida of more than 200 inhabitants, or within two miles of any incorporated city or town of more than 200 inhabitants, for the purpose of retailing, compounding or dispensing medicines or poisons for medical use, except as hereinafter provided.

SEC. 2. *Be it further enacted,* That it shall be unlawful for the proprietor of any store or pharmacy in any village, town or city in the State of Florida of more than 200 inhabitants, or within two miles of any incorporated city or town of more than 200 inhabitants, to allow any person except a registered pharmacist to compound or dispense the prescriptions of physicians, or to retail or dispense poisons for medical use, except as an aid to and under the supervision of a registered pharmacist. Any person violating the

* The laws of Florida, Louisiana and New York are all the laws which have been received for publication.—EDITOR.

provisions of this section shall be deemed guilty of a misdemeanor, and on conviction shall be liable to a fine of not less than $25.00 nor more than $100.00 for each and every offense.

SEC. 3. *Be it further enacted,* That the Governor shall appoint five persons from among the most prominent pharmacists of the State, all of whom shall have been residents of the State for two years, and of at least five years' practical experience in their profession, who shall be known and styled "Board of Pharmacy for the State of Florida," one of whom shall hold his office for one year, one for two years, one for three years, two for four years, each until his successor shall be appointed and qualified; and each year thereafter another Commissioner shall be so appointed for four years, and until a successor is appointed and qualified. If a vacancy occurs in said Board, another Commissioner shall be appointed as aforesaid to fill the unexpired term thereof. Said Board shall have power to make by-laws and all necessary regulations, and to create auxiliary boards, if necessary for the proper fulfillment of their duties under this act without expense to the State.

SEC. 4. *Be it further enacted,* That the Board of Pharmacy shall register in a suitable book the names and places of residences of all persons to whom they issue certificates, and dates thereof. It shall be the duty of said Board of Pharmacy to register without examination, as registered pharmacists, all pharmacists and druggists who are engaged in business in the State of Florida, at the passage of this act, as owners or principals of stores or pharmacies in any village, town or city of more than 200 inhabitants, for selling at retail, compounding or dispensing drugs, medicines or chemicals for medical uses, or compounding or dispensing physicians' prescriptions, and all assistant pharmacists over eighteen years of age, engaged in said stores or pharmacies in any village, town or city of more than 200 inhabitants in the State of Florida, at the passage of this act, and have been engaged two years as such in some store or pharmacy where physicians' prescriptions were compounded or dispensed; *Provided, however,* That in case of failure or neglect on the part of any person or persons to apply for registration within sixty days after they shall have been notified by said Board of Pharmacy for the State of Florida, they shall undergo an examination as is provided for in section five of this act.

SEC. 5. *Be it further enacted,* That the said Board of Pharmacy shall upon application of ten applicants for examination, and at such time and place, and in such manner as they may determine, either by a schedule of questions to be answered and subscribed to under oath, or orally, examine each and every person who shall desire to conduct the business of selling at retail, compounding or dispensing drugs, medicines or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as pharmacists, and if a majority of said Board shall be satisfied that said person is competent and fully qualified to conduct said business of compounding or dispensing drugs, medicines or chemicals for medical use, or to compound or dispense physicians' prescriptions, they shall enter the name of such person as a registered pharmacist in a book provided for in section four of this act; and that all graduates of colleges of pharmacy, that require a practical experience in pharmacy of not less than four years before granting a diploma, shall be entitled to have their names registered by said Board without examination; *Provided, however,* That this act shall not be so construed as to prevent any physician who is authorized to practice medicine or surgery under the laws of this State, from registering as a pharmacist or druggist, without examination; *Provided,* That any person or persons not a pharmacist or druggist, may open and conduct such a store if he or they keep constantly in their employ a registered pharmacist or druggist; but shall not himself or themselves sell or dispense drugs or medicines, except proprietary and patent medicines in original packages.

SEC. 6. *Be it further enacted,* That the Board of Pharmacy shall be entitled to de-

mand and receive of each person whom they register and furnish a certificate as a registered pharmacist without examination, the sum of two dollars, and for each and every person that they examine orally, or whose answers to a schedule of questions are returned subscribed to under oath, the sum of three dollars, which shall be in full for services; and in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for examination within any period not exceeding twelve months thereafter, and no charge shall be made for such examination.

SEC. 7. *Be it further enacted*, That every registered pharmacist, apothecary and owner of any store shall be held responsible for the quality of all drugs, chemicals or medicines he may sell or dispense, with the exception of those sold in original packages of the manufacturer, and also those known as proprietary; and should he knowingly intermingle and fraudulently adulterate, or cause to be adulterated, such drugs, chemicals or medical preparations, he shall be deemed guilty of a misdemeanor, and upon conviction thereof be liable to a penalty not exceeding $100, and in addition thereto his name shall be stricken from the register.

SEC. 8. *Be it further enacted*, That it shall be unlawful for any person not a registered pharmacist, from and after sixty days after the passage of this act, to retail any poisons enumerated below; arsenic and its preparations, corrosive sublimate, white and red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnine, and all other poisonous vegetable alkaloids, and their salts, and the essential oil of almonds, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce, aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, veratrum, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic and oxalic acids; and he shall label the box, vessel or paper in which said poison is contained, with the name of the article, the word poison, and the name and place of business of the seller. Nor shall it be lawful for any persons to deliver or sell any poison enumerated above, unless upon due inquiry it be found that the purchaser is aware of its poisonous character, and represents that it is to be used for a legitimate purpose. The provisions of this section shall not apply to the dispensing of poisons in not unusual quantities or doses upon the prescription of practitioners of medicine. Any violation of this section shall make the principal of said store liable to a fine of not less than $10, or more than $100; *Provided, however*, That this section shall not apply to manufacturers making and selling at wholesale any of the above poisons; *And provided*, That each box, vessel or paper in which said poison is contained shall be labeled with the name of the article, the word poison, and the name and place of business of the seller.

SEC. 9. *Be it further enacted*, That any itinerant vendor of any drug, poison, ointment or appliance of any kind intended for treatment of any disease or injury or deformity by any drug, nostrum or manipulation, or other expedient, shall pay a license of $500 per annum to the State, to be paid in the manner for obtaining public license, or according to the usual laws in force for that purpose.

SEC. 10. *Be it further enacted*, That any person who shall procure or attempt to procure registration for himself or for another under this act, by making or causing to be made false representations, shall be guilty of a misdemeanor, and shall, upon conviction thereof, be liable to a penalty of not less than $25 nor more than $100, and the name of the person so falsely registered shall be stricken from the register. Any person not a registered pharmacist, as provided for in this act, who shall conduct such a store, pharmacy or place for retailing, compounding or dispensing drugs, medicines or chemicals for medical use, or for compounding or dispensing physicians' prescriptions, or who shall

take, use or exhibit the title of registered pharmacist, shall be guilty of a misdemeanor, and upon conviction thereof shall be liable to a penalty of not less than $100.

SEC. 11. This act shall not apply to physicians putting up their own prescriptions.

SEC. 12. *Be it further enacted*, That it shall be the duty of every registered pharmacist to conspicuously post his certificate of registration in his place of business. Any person who shall fail to comply with all the provisions of this section shall be liable to a fine of $5.00 for each calendar month during which he is delinquent.

SEC. 13. The sum of $500 per year, or as much thereof as may be found necessary, is hereby appropriated out of the money so received for license for the expenses of said Board of Pharmacy. All surplus over and above said amount to be divided as follows: One half to the "Florida State Pharmaceutical Association," the remainder to be paid into the State Treasury.

SEC. 14. All suits for the recovery of the several penalties prescribed in this act shall be presented in the name of the State of Florida in any court having jurisdiction, and it shall be the duty of the State's Attorney of the county wherein such offense is committed to present all persons violating the provisions of this act, upon proper complaint being made.

SEC. 15. *Be it further enacted*, That all laws and parts of laws in conflict with the provisions of this act be, and the same are hereby repealed.

PHARMACY LAW OF LOUISIANA.

An Act to regulate the practice of pharmacy; to regulate the sale of compounded medicines and drugs, preparations and prescriptions; to regulate the sale of poisons; to create a State Board of Pharmacy, and to regulate the fees and emoluments thereof; to prevent the practice of pharmacy by unauthorized persons; and to provide for the trial and punishment of violators of the provisions of this act by fine or imprisonment.

SECTION 1. *Be it enacted by the General Assembly of the State of Louisiana*, That it shall hereafter be unlawful for any other than a registered pharmacist to compound medicines, drugs, or chemicals, or to institute or conduct any apothecary or drug store, or pharmacy shop for compounding drugs, medicines or chemicals, or for any person to be employed therein, or placed in charge thereof, for the purpose of compounding drugs or chemicals under prescriptions or otherwise.

SEC. 2. *Be it further enacted, etc.*, Any person twenty-one years of age shall be entitled to registration as a duly registered pharmacist, on exhibiting to the Board of Pharmacy a diploma from any college or school of pharmacy, in Europe or America, of good and respectable standing, the status of the institution as to respectability and standing to be judged and approved by said Board, together with the affidavit of the applicant, stating his age, nativity, and that he is the *bona fide* holder of the diploma, and the person named therein, and that he is a regular graduate or alumnus of said institution, or in case that said applicant shall produce no diploma as hereinabove set forth, it shall be sufficient for him to present an affidavit that he has had four years' practical experience in the manipulation and compounding of physicians' prescriptions under the supervision of a registered pharmacist, who shall also attest the truth of the said affidavit by swearing thereto, if said registered pharmacist be alive and resident in the State of Louisiana; and said affidavit shall set forth the age of the applicant, the place of his nativity, and when and where he has practiced pharmacy, said affidavits to be preserved on file by the Board of Pharmacy as a part of its records.

SEC. 3. *Be it further enacted, etc.*, That the foregoing provisions of this act shall not apply to or effect any person who shall be engaged in the actual preparation, compounding and dispensing of medicines or drugs in the drug and apothecary business, as proprietor of the same, or as qualified assistant thereof at the time of the passage of this act,

except in so far as relates to registration and fees provided in section five. A qualified assistant engaged in the business at the time of the passage of this act, is one who has had not less than two years' practical experience in the preparation, compounding and dispensing of medicines, or drugs in the drug and apothecary business. All other actual assistants actually engaged in the business at the time of the passage of this act, shall, upon the completion of a like term of two years' experience, be entitled to registration as qualified assistants without examination; provided, that nothing contained in this act shall in any manner whatever interfere with the business of any registered practitioner of medicine, nor in any way prevent him from administering or supplying his patients with such drugs and medicines as he may deem fit and proper, nor shall it interfere with the making and dealing in proprietary remedies, popularly called patent medicines, nor prevent storekeepers from dealing in and selling the commonly used standard medicines, and poisons, if all such standard medicines and poisons included in this section, conform in all respects to the requirements of section seven. Nor shall this act apply to any planter furnishing medicines to hands in his employment or leasing lands from him.

SEC. 4. *Be it further enacted, etc.*, That in case the Board of Pharmacy shall have reason to doubt the truth of the allegations of any affidavit made under the provisions of the foregoing section, it shall have the right to examine into and hear evidence thereon, and if convinced of the falsity thereof, it shall have the right to refuse registration, subject to the right of the applicant to appeal to the courts by mandamus; provided, that false swearing in an affidavit hereinbefore mentioned, shall be deemed perjury, and liable to punishment as in other cases under existing laws.

SEC. 5. *Be it further enacted, etc.*, That where the applicant neither furnishes the diploma or affidavit required by the foregoing sections, he shall have the right to registration after having passed a satisfactory examination by the Board of Pharmacy as to his qualifications and capacity, which Board shall thereupon register the applicant, and shall grant to him a certificate of registration as a pharmacist, the same as in the case of the production of a diploma or affidavit as hereinbefore provided. The Board of Pharmacy may grant certificates of registration to licentiates of such other State Boards, or the duly constituted authorities of other countries, without further examination. The Board of Pharmacy shall have the right to exact and collect from applicants, before issuance of a certificate, five dollars ($5) for an examination of the applicant, and three dollars ($3) for the issuance of the certificate.

SEC. 6. *Be it further enacted, etc.*, That the Governor shall appoint the Board of Pharmacy, consisting of nine (9) reputable practicing pharmacists, doing business in the State, who shall serve for four (4) years from the date of their appointment; any vacancy shall be filled for the unexpired term by the Governor's appointment. Said board shall elect a president, and an officer to be known as the secretary and treasurer, and in addition to its duties in holding examinations and granting certificates, it shall report to the prosecuting officer of the State of Louisiana all persons violating the provisions of this act; it shall report annually to the Governor of the State upon the condition of pharmacy in the State, any recommendations for the improvement of its practice, as well as a record of the proceedings of the board during the year; and the names of all pharmacists duly registered under this act, and the fees collected under the provisions of this act, shall be applied to the payment of the expenses of the Board, in such manner as it shall direct.

SEC. 7. *Be it further enacted, etc.*, That all pharmacists, druggists or apothecaries, shall label all bottles, vials, jars, boxes, parcels, packages, or other receptacles, or coverings, or wrappings of drugs, medicines or chemicals sold or dispensed by them, with a label in legible writing or printed letters, giving the name of the proprietor of the store, the name of the physician prescribing, or the shop and the place of sale of said drug, med-

icine or chemical; and in case the medicine, drug or chemical be of a nature poisonous to the human system or to animals, said label shall have printed thereon a skull and cross bones, with the word "Poison" in large, heavy lettering. All prescriptions shall have in addition thereto, a number, the name of the person actually and personally compounding the same, the directions for its use internally or externally, and the date of its compounding.

SEC. 8. *Be it further enacted, etc.*, That any person offending against any provisions of this act, shall be deemed guilty of a misdemeanor against the State of Louisiana, and shall be prosecuted before any court of criminal jurisdiction, and if adjudged guilty, shall pay a fine of not less than fifty dollars, ($50) nor more than one hundred dollars, ($100) and in default of payment thereof, shall be imprisoned in the parish jail for not more than thirty (30) days.

SEC. 9. *Be it further enacted, etc.*, That this act shall take effect thirty (30) days after its promulgation.

S. P. HENRY,
Speaker of the House of Representatives.
JAMES JEFFRIES,
Lieutenant-Governor and President of the Senate.

Approved July 11, 1888.

FRANCIS T. NICHOLLS,
Governor of the State of Louisiana.

A true copy from the original:
JOS. GEBELIN,
Assistant Secretary of State.

AMENDED NEW YORK STATE PHARMACY LAW.*

An Act to amend chapter three hundred and sixty-one of the laws of eighteen hundred and eighty-four, entitled "An act to establish a State Board of Pharmacy and to regulate the practice of pharmacy throughout the State of New York, except in the counties of New York, Kings and Erie."

Passed June 24, 1887; three-fifths being present.

The People of the State of New York, represented in the Senate and Assembly, do enact as follows:

SECTION 1. Section two of chapter three hundred and sixty-one of the laws of eighteen hundred and eighty-four, entitled "An act to establish a State Board of Pharmacy and to regulate the practice of pharmacy throughout the State of New York, except in the counties of New York, Kings and Erie," is hereby amended to read as follows:

SEC. 2. It shall be the duty of the said Board of Pharmacy,

1. To examine all persons applying for licenses under this act, and to grant licenses to such persons as may be entitled to the same, *providing, however, that no person shall hereafter be licensed as a pharmacist who has not had four years' experience in the practice of pharmacy. The Board may also issue certificates upon examination, which shall entitle the holder to act as an assistant pharmacist under the direction of a registered pharmacist.*

2. To keep a record of licensed pharmacists *licensed by them.*

3. To investigate all complaints of disregard or non-compliance or violations of the

* A copy of the original law was published in the Proceedings 1884, pp. 370 and 371. A copy recently furnished with the above amendments has the following, as

SEC. 13. The expenses of said Board shall be paid out of the fees herein provided for.

Sections 13, 14 and 15 (*loc. cit.*, p. 371) become Section 14, Section 15 and Section 16, respectively.

The changes and additions to the original law are above printed in italics.—PERMANENT SECRETARY.

provisions of this act, and to bring all *such* cases to the notice of the proper prosecuting officer.

4. *To render annually to the Governor, and to the State Pharmaceutical Association at their annual meeting, a full statement of all their receipts and disbursements during the year preceding.*

SEC. 2. Section seven of said act is hereby amended so as to read as follows:

SEC. 7. The New York State Pharmaceutical Association shall *at each annual meeting* nominate *five* pharmacists, residents of the district to which this act applies, from which number the Governor shall fill the vacancy annually occurring in the *said* board, and the person so appointed by the Governor shall hold office for five years. In case of the death, resignation or removal from the State of any member of *said* board, before the expiration of his term of office, or in case of vacancy occurring from any other cause than expiration of term of office, the Governor shall fill the vacancy from the list of names nominated as aforesaid during the year in which such vacancy occurs, and the person appointed shall hold office for the unexpired term of his predecessor.

SEC. 3. Section fourteen of said act is hereby amended so as to read as follows:

SEC. 14. *This act shall not apply to the counties of New York, Kings, and Erie, provided, however, that a license as a pharmacist granted any person after examination by any board of pharmacy legally created under the laws of this State shall entitle said person to a license or a certificate of registration as a pharmacist from any board of pharmacy legally created under the laws of this State upon presenting to such board his said license and complying with the formal requirements of said laws.*

SEC. 4. *The phrase, "usual domestic remedies," in said act is hereby defined as follows, namely: Medicines that from common use a knowledge of their properties and dose has been acquired and includes only such remedies as may be safely employed without the advice of a physician, such as Epsom salts, Rochelle salts, salts of tartar, borax, sulphur, magnesia, camphor, aloes, myrrh, guaiac, arnica, rhubarb, senna, squills, ipecac, and preparations of above; also castor oil, olive oil, origanum, spike, amber, wintergreen, peppermint, and wormwood, glycerine, spirits of nitre, and other like remedies; but does not include opium, morphine, laudanum, strychnine, arsenic, belladonna, aconite, and other poisons requiring knowledge and pharmaceutical skill to safely dispense, unless they be sold in original packages, or packages bearing the label of a licensed pharmacist. The phrase "rural districts," used in said act is hereby declared to apply only to small villages and country districts having no store where pharmacy is practiced. The phrase, "practice of pharmacy," used in said act is hereby defined as follows, namely: The compounding of prescriptions or of any United States Pharmacopœial preparation, or of any substance to be used as medicine, or the retailing of any drug or poison for medicinal purposes.*

SEC. 5. *The sale of Paris green, white hellebore and other poisons for destroying insects or of any substance for use in the arts are exempt.*

SEC. 6. This act shall take effect immediately.

REPORT

ON THE

PROGRESS OF PHARMACY.

FROM JULY 1, 1888, TO JUNE 30, 1889.

BY C. LEWIS DIEHL.

The introductory to his report has given the reporter no little concern in past years, from the fact that he has not found the time to embrace in it, as he should have wished, a synopsis of the more important contents of the report. Looking about for subjects that might be properly embraced in the introductory, it was thought that a brief synopsis of the proceedings of the different State Pharmaceutical Associations would prove of interest; but an experience of five years has convinced the reporter that the utility of this is, to say the least, problematical. The exhibit in this direction has been incomplete and fragmentary, mainly for the reason that the Proceedings of the State Associations, or a synopsis of the same, have failed to reach his hands in time for the report, and this feature has therefore been omitted in the present.

The further search for material to be embraced by the introductory developed that many subjects not otherwise classified might be brought to notice here, and this was done to some extent, particularly in last year's report. In the course of this work it was found that the "editorials," which constitute an important feature in some of the pharmaceutical journals, have hitherto been almost completely neglected, and that these might properly be represented in this portion of the report, since they voice the subjects that prominently engage the attention of pharmacists throughout the land. In the following it is intended to present some of these, together with such subjects of a general or special character as it has been found most convenient to present here, or inconvenient to classify in the body of the report; but it should be understood that they are simple abstracts, given as nearly as possible in the language of the individual authors, and that the reporter assumes neither credit nor responsibility for the opinions that may be expressed. For convenient reference, the subjects discussed are indicated by the headings.

Statistics Respecting the Consumption of Medicinal Agents.—An exceed-

ingly interesting statistical communication respecting the consumption of medicinal agents in the Paris Hospitals, from 1879 to 1885, has been made by Messrs. Bourgoin and De Beurmann. As might have been expected, the antiseptic treatment of wounds has had a decided influence upon the consumption of certain agents. Thus the use of *carbolic acid* has increased from 369 to 11217 kilos; of *boric acid* from 10 to 1909 kilos; of *thymic acid* from 0.25 to 12.42, and of *thymol* from 0 to 3.95 kilos; of *permanganate of potassium* from 8.35 to 28 kilos: of *corrosive sublimate* from 102 to 314 kilos; of *iodoform* from 22 to 353 kilos. On the other hand, *salicylic acid* has been used to a far less extent, it having decreased from 20 to 7 kilos during the same period; but this is compensated by the increased internal use of *salicylate of sodium*—from 182 to 355 kilos, and the introduction of *salicylate of bismuth*—from 0 to 18 kilos, as well as by the fact that its use as an antipyretic has been supplanted by newer and more powerful agents. That the use of salicylate of bismuth depends mainly on the salicylic acid it contains, is demonstrated by the fact that the use of *subnitrate of bismuth* has not been diminished, but has increased during this period from 347 to 419 kilograms. It is somewhat remarkable that notwithstanding the appearance of the numerous synthetical antipyretics, the use of *quinine* and of *cinchona barks* should have increased, instead of diminished. The use of *sulphate of quinine* has increased during this period from 40 to 70 kilos; of *Loxa bark* from 2610 to 4078 kilos; of *yellow bark* from 91 to 161 kilos; a decrease being noted only in the *cinchona grisea bark*, from 7749 to 7325 kilos. It should be remembered, however, that this report closes with the year 1885, and that it was not until 1884 that the first successful synthetical antipyretic was introduced. The consumption of *iron preparations* has on the whole held its own, there being a decrease only in *iron per hydrogen*, but a corresponding increase in *pulverized iron*. The *iodide of iron* is rarely used in other forms than in that of syrup. *Arsenical preparations* are used more frequently, and *carbonate of lithium* has come into use. The *saline*, *vegetable* and *drastic purgatives* are used about to the same extent as 10 to 15 years ago, and it is only in the case of the so-called infectious diseases, in which the infection is produced in the alimentary canal, that the use of purgatives has decreased, the same being replaced by disinfectants, such as *naphthalin, naphthol, salol*, etc. *Leeches* are but rarely employed. *Alcoholics*, the use of which increased up to 1880 in gigantic proportions, have since lost ground, apparently because the value of more active therapeutic treatment is again recognized, and the use of pure tonics is thereby retarded, the decrease in the use of *caffeine* preparations also supporting this view. An enormous increase is shown in the use of *anæsthetics* and their virtually allied agents. In the case of *chloroform* the increase observed is from 326 to 787 kilos; of *ether* from 629 to 1145 kilos. *Opium* is used to the same extent, but the

use of *morphine* has increased. The principal narcotic extracts are used to about the same extent, but the use of *chloral* has increased from 350 to 840 kilos; that of *bromide of potassium* from 813 to 1886, while *bromide of sodium*, which at first increased from a minimum quantity to 53 kilos, has again decreased to 39 kilos. *Bromide of ammonium* is, on the other hand, used to a greater extent, it being evident that the selection of a bromide very much depends upon variable judgment respecting the medicinal value of the bromine and of the metal with which it is combined.

Respecting the use of *antipyrin*, the statistics could only be given for one year, the increase from 1884 to 1885 being from 0.725 to 26.4 kilos. The other synthetic antipyretics are not embraced in the communication, because they either had not yet been introduced, or had been used only to a slight extent. The so-called *antispasmodics*, such as *aqua laurocerasi*, *camphor*, etc. have held their own; the excitants of the muscular system, such as veratrine, strychnine, brucine, and the substances yielding them, have fluctuated more or less; while the use of *ergot* and its extract has steadily increased. The use of the simple *bitters* is in steady decrease, for, although *gentian* and *colombo* are used to a somewhat larger extent, this increase is more than compensated by the greater decrease in the use of quassia, lupulin, etc. The *antimonials*, *digitalis*, *ipecacuanha*, are stationary, *jaborandi leaves* and *pilocarpine* have retrograded, while the consumption of *coca leaves* has increased from 2 to 46 kilos, and that of *cocaine* from 44 to 640 grams. *Potassium chlorate* and *borax* have steadily grown in favor, as also *creasote* and *santal oil*, while the use of *cubebs* and *copaiba* has sensibly decreased. *Tapeworm remedies* are as a whole used less than formerly, and among these particularly *kousso* and *male fern*, while *pomegranate bark* maintained its own, and *pelletierine* increased materially. The consumption of *pepsin*, which had increased from 200 grams in 1860 to 89 kilos in 1879, has since decreased to 50 kilos. Having been introduced into therapeutics on the basis of physiological speculation, this remedial agent has been retained by virtue of its innoxiousness, notwithstanding the fact that better results might be expected from the administration of *hydrochloric acid* as an aid to the enfeebled natural digestive juices, the latter being at the present generally employed for this purpose. The *liquid peptones* reached their maximum (1000 kilos) in 1883, while the *solid peptones* still showed an increase in 1885 of 349 kilos. There has been an increase in the use of all *iodine* preparations with the exception of *iodide of lead; tincture of iodine* from 673 to 1576 kilos, *iodide of potassium* from 531 to 1075 kilos, *iodide of sodium* from 0 to 11.5 kilos. The *caustics* and *vesicatories*, on the other hand, are disused more and more. *Mercurials* are also on the increase, the use of *mercuric oxide* having increased from 0.7 to 2.3, *corrosive sublimate*, as already stated, from 102 to 314, *calomel* from 22 to 45, *yellow iodide of mercury* from 5 to 15, *biniodide of mercury* from 1.4 to 19.6, and

basic sulphate of mercury from 10 to 25 kilos. The *alkaline sulphides* steadily replace the use of natural *sulphur water;* silver nitrate is used in continually increased quantities; *collodium* has increased from 195 to 297 kilograms, while the consumption of *glycerin* has increased from 7000 to 23000 kilos. These statistics prove incontrovertibly the general acceptance and extension in the use of antiseptics and anæsthetics, and that these two classes of medicinal agents qualify the therapeutics of the present period.

Percolation as Practised in Europe.—The "Amer. Drugg." (November 1888), speaking of the conservatism of European pharmacists in adopting new methods, particularly when such emanate from America, says that "The year 1876 undoubtedly marks an era in pharmaceutical international reciprocity. Not only were our own pharmacists made better acquainted with the old European ways and methods, but European pharmacists were, for the first time, made thoroughly acquainted with our best features and processes. Among these, the process of percolation, adapted to the preparation of tinctures, and particularly to that of *fluid extracts*, stands at the head. Though the principle of the process was first suggested in Europe many years previously, yet it was only applied, at least almost exclusively, in chemical laboratories or certain technical works. While the usefulness and expediency of this process were recognized by leading authorities, there were, however, serious obstacles in the way of its introduction. The principal obstacle was this, that the continental Pharmacopœias prescribed the old process of macerating the drug with the whole quantity of menstruum, in the case of tinctures and similar preparations; and as this process requires no special apparatus, no expert skill, and no watching, it was not likely that pharmacists would take kindly to another process, involving new appliances and demanding extra work. The fact that the old process consumed a large amount of time, compared with the new one, was hardly taken in consideration. Time—in the sense here meant—is not as valuable a commodity to the pharmacist in Germany as it is to us, because he is, to a large extent, protected against undue competition by the laws of the land."

"In the course of time, certain enterprising American manufacturing firms took particular pains to draw the attention of European pharmacists to the class of fluid extracts, by making prominent exhibits at international or special expositions, by placing specimens in the hands of prominent medical experts for trial, by copious advertisements, and by other means. There can be no doubt that to these causes the more rapid recognition of the value of fluid extracts is chiefly due. It was curious, and sometimes amusing, to read papers, even coming from well-known authorities, which appeared to have knowledge only of fluid extracts of the newer drugs, introduced and specially advertised by the firms alluded to, it being altogether overlooked that these preparations had been long

in use, and that our Pharmacopœia recognizes a large number made from the well-known, older, and universally used drugs. Gradually, however, the list of fluid extracts is extending, and it will not be long before this class of preparations will be as well made, and as generally used, in Europe as it is in this country."

Fluid Extracts—Preparation of Half the Present Strength.—The question of the advisability of making fluid extracts of half the present strength, discussed in the President's annual address to this Association last year, elicits some remarks by the "Amer. Drugg." (Dec. 1888), which, in the main, opposes the introduction of such preparations into the Pharmacopœia. The editor says:

"If we were in the fortunate position of having to construct our *first* Pharmacopœia, with nothing preceding it, excepting the experience of other nations, we would be fully justified in adopting the very convenient compromise afforded by Prof. Lloyd's plan between the tinctures and fluid extracts. These two last-named preparations, however, have gone so thoroughly over into the flesh and blood, as it were, of the pharmaceutical and medical professions, that, even if a new class of preparations, such as suggested by Prof. Lloyd, were actually introduced, either officially or by private enterprise, the tinctures and fluid extracts would still be prescribed. And here is just the difficulty. The strength of the different preparations, or the doses, might be confounded. Besides, a liquid percolate obtained by passing the menstruum, however slowly, through 8 ounces of drug, so as to obtain a pint of percolate, will in many cases not fully represent the active constituents of the 8 ounces. To do this fully, it would be required to exhaust the drug and then to adjust the volume to 16 fluidounces. But we understand Prof. Lloyd's objection to this very well. He thinks that a slight deficiency of the product in soluble matters not extracted, and therefore absent in the pint of liquid, is amply made up by the better quality of the product in other directions, as it has not been subjected to heat, and will probably be less likely to precipitate. However, to return to the principal objection: Physicians will most certainly keep on prescribing tinctures and fluid extracts—for does not past experience teach us how hard it is to cause old preparations to be relegated to oblivion? We agree with Prof. Lloyd that the introduction of the new preparations would be advisable *only* if the old ones can be entirely replaced by the new. But as this is not likely to happen, we foresee no chance for the latter, even in the distant future."

The "Druggists' Circular" (Jan. 1889) takes the opposite view regarding the proposition to make fluid extracts of half the present strength, on the ground that the fluid extracts of the market are not uniform and rarely conform to the Pharmacopœia, and that it is desirable to encourage a process that will be followed by pharmacists generally. It says: "This plan has the merit of simplicity. All the disturbing factors in the

present processes would be eliminated by its adoption; most if not all drugs could be practically exhausted by doubling the amount of menstruum; heat would be wholly avoided, and any one skillful enough to make a tincture could, without hesitancy, undertake the preparation of the new fluid extracts."

Fluid Extracts.—Why they should be made by the Retail Druggist.—A very sensible paper on this subject is that of W. W. Kerr, whose plea for the preparation of fluid extracts, as well as galenical preparations in general by pharmacists may be condensed as follows: 1. Because it is, in the first place, exactly what it is their business to do. 2. Because, in the matter of reliability of the product, the circumstantial evidence, at least, gives the advantage decidedly to the retail druggist. 3. Because a fluid extract that exactly fulfils the requirements of the U. S. P. is the point, and the only point to be arrived at, and this can be accomplished by the pharmacist, and no better by the manufacturer. 4. Because greater uniformity of product, the great end and aim of all official standards, is attained, for the reason that the retail druggist knows no other standard than his Pharmacopœia, whilst the manufacturer often knows no other than his own self-constructed one. 5. Because the retail druggist can make his own fluid extracts cheaper than he can buy them.

As to the apparatus, the ordinary percolator used in the shops is amply sufficient to secure complete exhaustion—indeed, this operation is to be continued until that object is attained, and no other apparatus can do more. In the matter of obtaining the best drugs for their preparation, it is surely easier to determine any deficiency in such, than in the fluid extracts that have been made from them.—"Phar. Era." May 1889, 181–182.

Standardization of Fluid Extracts.—The "Standardization of Fluid Extracts" was the subject of a graduation thesis, recently offered by a candidate for the degree of Doctor of Medicine, in which the author gives the results of a series of assays of fluid extracts, showing extreme variations in the strength of these preparations, and urges the establishment of standards of strength for each. He asks manufacturing pharmacists to take the initiative in the work, and establish provisional standards of strengths, "until our recognized authority, the U. S. P., in the next revision sees fit to fall in with scientific advancement, and adopts a general system of standardization for all galenical preparations." The "Phar. Era" (July 1888), calling attention to this paper, takes occasion to remark that it is a hopeful sign of the times that such a subject can be handled with a fair degree of ability by a student of medicine. "When physicians are educated up to such a point that even a few of them are able to pronounce authoritatively on the respective medicinal values of different samples of a tincture or fluid extract, the pharmacists who supply such preparations, either for their individual use in filling prescriptions, or for the trade, will be very careful to have them of what may fairly

be called standard strength, and they will moreover become suddenly convinced that it is quite within their power to judge themselves of the quality of the products which they purchase." As to the pharmacopœial authority: "We can pardon in an undergraduate the confusion of thought which places the U. S. P. as an authority above those who constitute it their authority; the difficulty is that physicians generally, and pharmacists, too, for that matter, ignore their individual responsibility to do all that in them lies to make their own Pharmacopœia just what it should be. It is they themselves, not the impersonal "Pharmacopœia" that are waiting to be forced to fall in with the progressive movement with which they declare themselves to be earnestly in sympathy."

Important Observations Respecting the Change of Alkaloids during the Process of Extraction.—The observation of W. Will that belladonna does not contain atropine as such, but primarily hyoscyamine, which furnishes atropine by the combined influence of alkalies and heat, leads the "American Druggist" (Aug. 1888, 156) to call attention to the probable change to which other alkaloidal constituents of plants are subject under similar conditions, such as light, heat, the influence of chemical reagents, etc. It appears quite probable that, by a modification of treatment, the alkaloids extracted from a given lot of cinchona bark, for instance, will be found to consist of entirely different proportions of the several bases than when the usual processes now in vogue are employed. If it were possible to isolate these bases by the agency of a substance which would leave them entirely unchanged, a great advance, it is pertinently argued, would be made towards a true understanding of the chemical nature of the mother bases, and of the manner in which the secondary ones are derived from it. Another discovery of importance in this connection is the

Convertibility of the Amorphous Bases of Coca into Cocaine.—Professor C. Liebermann and Dr. F. Giesel describe a simple process by means of which the amorphous bases extracted along with the chief alkaloid from coca leaves, can be converted into pure, crystallizable cocaine, and which is likely to revolutionize the whole cocaine industry. The "Amer. Drugg." (Jan. 1889), calling attention to this discovery, and to the fact that the process has been patented, expresses doubt as to the practicability of controlling the patent, "as the process does not require either any special apparatus, or any special intermediary agent or patented ingredient. Moreover, the patentee has no means of knowing whether any cocaine sold by a manufacturer has been obtained naturally or artificially. If the process of converting the hitherto useless and rejected amorphous bases into pure cocaine is as easy as the authors describe, manufacturers will no longer have any excuse for putting on the market any product from coca except the pure, crystallized alkaloid cocaine and its salts. Most manufacturers have heretofore, of their own accord, only sold the pure alkaloid and its salts, and have put aside the amorphous bases as

waste by-products. These latter will no doubt now be rapidly worked up and put on the market in form of cocaine. In consequence thereof, the price of cocaine, which is already so low as to leave but little profit to the maker, will probably fall still lower, and eventually the manufacture of cocaine will be concentrated in fewer hands than at present."

Analgesine—The attempt in France to overcome the patent laws of that country by changing the name of the chemical compound introduced under the name of antipyrine, into analgesine, is deservedly rebuked by the "American Druggist" (July 1888, 135). The plea that the so called "dimethyloxyquinizine" was originally intended as a substitute for quinine, and has not proved to be such a substitute; but that it does possess analgesic properties, and is therefore more appropriately called "analgesine," is not alone not based upon facts, but is too trivial to merit recognition. The claim originally put forth was that antipyrine has the power of reducing febrile temperature, and this claim has been completely vindicated by experience, and its original name is thus justified. Its anodyne and analgesic properties are of comparatively recent discovery, and instead of disparaging, only add to its value. As to the constitution of the compound, while Dr. Knorr, its undoubted discoverer, announced it originally as dimethyl-oxychinizin, he has given up this theory long ago, a more intimate study having led him to view its constitution differently. While ethically and theoretically we may be opposed to patents on medicinal agents, this objection cannot interfere with established rights so long as the law permits the issue of such patents. Therefore an annulment of a patent, provided it is rightfully granted, is a serious breach of contract on the part of a state. Had antipyrine remained a comparatively insignificant article, such as kairine, thalline, etc., it would probably not have been attacked at all.

Terpene.—Free Volatile Oils.—Respecting these products the "Phar. Jour. and Trans." (Aug. 1888) calls attention editorially to the importance of the discovery by Wallach that the terpenes, which constitute a large percentage of the component parts of the essential oils, are in the first place identical as obtained from different oils, and secondly are not the principles to which the odor of the oil is due. These odorous principles have now been successfully separated, and have been introduced under the general designation of "*Olea aetherea sine terpeno.*" Such have been obtained from oil of orange peel, juniper, and lemon—the product from the latter oil, for instance, possessing thirty fold the strength of the ordinary oil.

Another subject that deserves particular attention is the observation that the *Specific Gravity of Essential Oils* is found in practice to vary very materially from the U. S. P. description. A well-known American firm, manufacturing and dealing largely in essential oils, having recently announced that their laboratory records show a material discrepancy be-

tween the specific gravities assigned to certain essential oils by the U. S. Pharm. (and other authorities) and those observed by themselves, the "Amer. Drugg." (Aug. 1888, 158) makes some timely remarks with the view to explaining the discrepancy. The exact determination of the specific gravities of essential oils is a much more difficult task than is generally supposed. That this is so must be inferred from the fact that it has taken the largest manufacturers and dealers, American and foreign, handling tons upon tons of these oils, nearly five years after the appearance of the U. S. and German Pharmacopœias, to pronounce definitely what should be the correct specific gravities. It fact it has been recognized only during the last few years that the results of the large manufacturers show, in quite a number of cases, material differences from those obtained in the chemist's laboratory. These differences may arise from various causes. Either there may be loss from incomplete condensation of the lightest boiling portion, or from incomplete exhaustion of the odorous material, or from unequal degrees of heat, or—perhaps mainly—from the difference in treatment which the crude oil has undergone. Most crude essential oils, which are obtained by distillation, are subsequently rectified one or more times, and here the large manufacturer has a decided advantage over the experimental chemist, as, with his superior apparatus, he encounters a much smaller loss by resinification, etc., than the experimenter on a small scale. It is therefore not to be wondered at, that differences should be found between the results obtained in the one or the other manner. The implied charge made in a recent editorial of the "Paint, Oil and Drug Reporter," that the last Committee of Revision of the U. S. Phar. had been negligent in their work, is therefore not justified; but in establishing the proper figures for the specific gravities of essential oils in the next U. S. Phar., it will no longer suffice to rely upon the results of even the best experts, if these are arrived at by working on a small scale, and it will be necessary to take into account the products of the manufacturers. To this end it will be necessary that the next Committee on Revision shall be put, by manufacturers of essential oils, in possession of all data bearing on this subject, thus assuring correct figures, and relieving the manufacturer from the onus of having to defend his *bona fide* products against supposed standard figures, which may be correct and true for the conditions under which they were obtained, but which it is impracticable for him to imitate.

Respecting the introduction of

Vanillin into use in recent years, the same journal (Dec. 1888) remarks that "at one time it was supposed that artificial vanillin would ruin the vanilla industry and trade, just as artificial alizarin has practically ruined the madder industry. But, curiously enough, this has not been the case. Vanilla holds its own extremely well. In fact, there is much more vanilla grown and sold at the present time than before vanillin was known as a

commercial product. And yet, the latter is also consumed in constantly increasing quantities. There is one reason for this. It is well known that an extract of vanilla made from the bean contains other matters besides the vanillin, among them what is usually termed "extractive," and a good deal of coloring matter. Now these substances have the power of binding or holding the odor of vanilla much more energetically than a simple neutral solvent would. Therefore, if two liquids are made of as near equal strength in odor and taste of vanillin as possible, one from vanilla bean and the other from vanillin, and if these two liquids are used, in equal proportions, to flavor equal amounts of any inert or insipid mixture, it will be found that the one flavored with the extract of the bean will retain its odor longest. But this property is not always required of the flavoring. When used for culinary purposes, it is seldom required to preserve the odor or taste of some flavored delicacy more than 48 hours. On the other hand, when chocolate or other confectionery is made on the large scale for the market, it is necessary to insure the stability of the odor and taste for as long a time as possible. Hence while artificial vanillin is perfectly satisfactory in the former case, the natural bean is preferred in the latter. It is usually considered that 1 oz. of vanillin is equivalent to 40 oz. of good vanilla beans."

Spurious Cascara.—Referring to a recent paper by Mr. John Moss on "spurious cascara" (which see), the "Drugg. Circ." (April 1889) called upon Dr. Rusby to criticise the paper referred to. This criticism is given in an editorial, as follows:

"The question he said was not so much one of kind, inasmuch as the Oregon and California barks are practically of the same species and variety. Whether the Oregon form will prove to be equally potent with that collected in the dryer regions farther south, remains to be seen; that can be established only by long continued practical trial. It is not possible to say positively from an examination of the bark, whether in its rough state or under the microscope, that it will be identical in its action with another sample. The real questions to be determined are, first, that it is the genuine variety and not some similar but distinct species; second, that it be collected in the proper season of the year; and third and most important, that a sufficient time be allowed to elapse after its collection for it to lose its tendency to produce griping before being used. This time should not be less than one year."

"The bark referred to in Mr. Moss' paper as being a false or spurious bark, Dr. Rusby thinks genuine. The genuine cascara sagrada grows perhaps even more abundantly in the moist valleys of Oregon than it does in California. The fact of its changed external appearance is due to the different conditions of growth. The real danger is from an admixture of the bark of Rhamnus Californica or some of its varieties, which very closely resemble certain of the varieties of R. Purshiana, but are very distinct in their medicinal properties."

Unofficial Formulary of the British Pharmaceutical Conference, 1888—The formulary adopted by the British Pharmaceutical Conference in 1887 has been revised and several additions made, viz: Acetum ipecacuanhæ; Elixir Phosphori; Elixir Saccharini; Extractum Tritici Liquidum; Liquor Hypophosphitis Fortius; Syrupus Codeinæ; Syrupus Ferri Bromidi; Syrupus Ferri et Quininæ Hydrobromatum; Syrupus Ferri, Quininæ et Strychninæ Hydrobromatum; Syrupus Ipecacuanhæ Aceticus; Syrupus Pruni Virginianæ; Tinctura Calendulæ Florum; Tinctura Capsici Fortior; Tinctura Euonymi; Tinctura Phosphori Composita; Unguentum Oleo-Resinæ Capsici. Several formulas were dropped, and minor changes were made in a few others. The formulas that have been added in 1888 will be found under their proper headings, indicated by the letters B. P. C.

The Unofficinal Formulary of this Association has been received with general favor, and is recommended by the Pharmaceutical press with perhaps a single exception, and in this it is not clear upon what ground the opposition is based. The

Use of Unofficinal Preparations by prescribers is, as a matter of course, not confined to our own country. That it should exist, however, to so great an extent in Germany, as becomes manifest from the evidence gathered by the Pharmacopœia Committee of the German Pharmaceutical Association, is somewhat surprising. It is shown, as the result of inquiries in the clinics of five of the principal German Universities, that of about 1200 different articles employed, only about 600 were officinal, the remainder being either ex-officinal or such having no fixed legal standard. Commenting on this, the "Amer. Drugg." (Nov. 1888) says:

"The problem which our German colleagues have to face is one with which we have long been familiar, and for which the only possible solution was the preparation of some interim-standard, to be in force until a higher authority should provide a formula for any preparation contained in it. Had we not done this, we could have only attempted the next best alternative, namely, to select a number of privately published works, formularies, dispensatories, etc., which we might have agreed among ourselves to regard, for this or that preparation, as authoritative. It might have been necessary to name twenty or more different works to cover the best of all the formulas needed. And what guarantee would there have been that any new edition of any of these works would still afford us the reference wanted? We have certainly chosen the most practical solution of the difficulty, and strongly advise our German confrères to adopt the same plan we did."

"We all know why old remedies do not easily disappear. Old physicians will prescribe what they have learned to use in their early days, and as many of them are exceedingly conservative, it is hard to get them to use new things. At all events, it is harder to get them to throw the old things aside."

The near approach of the Decennial Revision of the U. S. Pharmacopœia has naturally elicited a number of discussions respecting the

Pharmacopœial Method of Determining Quantities in its Formulas.—The "Drugg. Circ." (Feb., 1889) discusses the proposition to return to the old system of expressing the proportions in the formulas of the Pharmacopœia by definite weights for solids and measures for all liquids. In opposing such a change it says: "The weighing of liquids ensures accuracy in apportioning quantities as far as any method can insure it. The graduation of measures is, to begin with a more difficult thing than the adjustment of weights; and after the graduation is properly accomplished it is much harder to correctly use a measure than a balance. This difficulty increases with the size of the graduated measure, as a slight variation in the level of the liquid is multiplied by the area of its surface." "It has been shown by experiment that where all the ingredients of a preparation are weighed, greater accuracy in results is attained than where the mixed system is employed. Another great advantage of using weights only is that the relative proportions of the ingredients can be stated in the simplest manner, and percentage formulas made to take the place of the old fashioned, so-much-to-the-pint ones. As against these great advantages we have the trifling drawback of carrying the bottles to the scales and of providing a counterpoise for the vessel in which the liquid is to be weighed. A very simple contrivance for the latter purpose, which we have been told is much used by Continental pharmacists, is simply a box or can containing shot, the quantity of which can, of course, be promptly reduced or added to as occasion demands. A complete arrangement of this kind could be made by using say two tin cans, one of which when filled with shot (which should be very small) would counterbalance the largest vessel likely to be used, and the other to be kept at hand to receive the surplus of metal when necessary to reduce the weight for smaller vessels. The greater drawback of prejudice is not so easily disposed of. Those who know least of the practical working of the "parts by weight" system seem to be strongest in their opposition to it; they do not even seem to ask the experience of others. This is scarcely becoming in a body of people laying any claim to scientific attainments. The only way to determine the value of the system is to faithfully try it. We know of some pharmacists who promptly did this as soon as it was proposed, and they have had no desire to return to the old method. If all others had followed their example, the general experience would probably have been the same; if not, a good reason could have then been urged for continuing what many now consider an antiquated plan."

Pharmacopœial Authority.—The question of pharmacopœial authority is discussed by the "Pharm. Era," (August 1888), and more particularly with reference to the methods of opium assay practiced in the U. S.

Custom Houses. "There is a specific law prohibiting the importation of opium containing less than nine per cent. of morphine. Nothing is said in the statutes about the method to be employed for ascertaining the proportion of morphine. It was presumed that expert chemists would be able to make the necessary determination, and that the experts would be themselves the best judges of what were the best methods to employ. It was to be expected that year by year the processes in use would be improved and simplified, and that the government experts would not rest satisfied with any process susceptible to further improvement." "The fact that the government experts continue to ignore the U. S. P. process of assay has been recently commented on by several writers, who, without personal prejudice in favor of this process, urge that it is the only one that the law allows and should therefore be insisted upon. If they could have their way, a change would be made in this opium standard, which would exclude a very large proportion of the drug shipped to America, all of which is really high grade of opium." "After all, it is a question whether there is any statute which would even justify the adoption of the supposed U. S. P. standard in place of that fixed by Congress (nine per cent. morphine content). The law appealed to is one *permitting* the importation of drugs, medicines, etc., 'which are not inferior in strength and purity to the standards established by the United States, Edinburgh, London, French and German pharmacopœias and dispensatories,' a law which certainly admits of the most liberal construction." "On the whole it seems to us wisest to accept the U. S. law as final, and leave it to experts to settle how the assays shall be conducted."

Subjects of a practical character are discussed in several editorials. Thus, speaking of the

Sale of Patent Medicines, the "Drugg. Circ." (Jan. 1889) advises pharmacists with the advent of the new year to consider whether they are not in some degree responsible for the large assortment of preparations popularly known as "patents," that encumber their shelves. The question is asked: "How does it come that the apothecary has assumed the role of chief distributing agent for such things? He will usually tell you that he keeps them in obedience to the demand created by the makers. This is undoubtedly true in the main, but it will be well for him to consider whether he has not contributed to the creation of this demand. He has perhaps allowed advertisements to be inserted in the newspapers, stating that at his well stocked and well-regulated pharmacy, Blank's Black Dose may be obtained, and he perhaps hands out to his customers almanacs and various other advertising contrivances, bearing his card and recommending nostrums." "To really advance the true interests of pharmacy, to say nothing of its profits, an opposite course is needed, and this course is easy to follow. If instead of quietly allowing himself for some slight apparent advantages to be made an agent for quacks, the phar-

macist would faithfully use the innumerable opportunities he has to discourage the use of nostrums, his shelves would soon bear less of them than they do now. They would not long pursue their present prosperous way in the face of his determined opposition, as the drug store remains the center of attraction to the sick, notwithstanding the efforts of the grocery men and the "all-trade bazaars."

Speaking of the general neglect of druggists to make use of their special facilities for the

Decorative Treatment of Drug Stores, the "Amer. Drugg." (July 1888) calls particular attention to the improper method of lighting them. It is a common practice to so place the gas lights as to dazzle by their glare the eyes of the passer-by, and prevent him from distinguishing the details of objects in the interior of the store. The remedy consists in reflecting the light to the interior, after the manner employed by dealers in pictures. The light should come from the same source in the night that it does in the day-time, namely, from the windows, where, along the upper part of the window-spaces, lamps or gas-jets should be arranged in number sufficient to light the main body of the store, and having reflectors between them and the windows, which will intercept and throw towards the back of the store all rays which would otherwise pass outward toward the street. At the back of the store should be placed objects which, in turn, reflect the light towards the front, such as shelf-bottles with gilt labels, show-bottles with colored contents; while midway should be arranged such things as toilet bottles in cut-glass, with sparkling facets and numerous angles. Any chandeliers in the center of the store should be but dimly lighted. In the direction of

Proper Labeling of Chemical and Pharmaceutical Products,—some progress has also been made. The resolution passed by the Commercial Section of this Association at the Detroit meeting, to the effect that manufacturers be asked to label their products, as far as possible, in accordance with the officinal nomenclature, to abandon unscientific and arbitrary standards, such as degrees of Baumé, "ff" marks, etc., and to express strength by figures representing specific gravity or percentage of active constituents, has borne good fruit, one large firm at least having announced that it has adopted the recommendation of the Association, and that it will comply with it hereafter. The "Amer. Drugg." (Jan. 1889), congratulating this firm on the wisdom of their resolution, and expressing the hope that others will follow in the same wise course before long, remarks:

"We have for years maintained, and are more convinced than ever, that any house which will bestow the proper care upon the labels which it attaches to its products, so as to make these labels not only *commercially useful* and *correct*, but also *instructive* beyond the purely commercial aspect, will quickly feel the results in a largely increased trade. There

seems to be an unwillingness, on the part of large manufacturers and dealers, to depart from long established customs. Some of these houses are so very conservative, that they even pay but little attention to the periodical changes in pharmacopœial standards, expecting that the Pharmacopœia Committees should rather fix the standards in accordance with the strength and quality of the products put by them on the market, than that their products should be accommodated and adjusted to the standards established by the Pharmacopœia. It must be said, however, that after the appearance of the *last* Pharmacopœia, manufacturers and dealers have much more readily and speedily modified their products so as to comply with the new official standards. This was chiefly brought about by the enactment of laws regarding the purity of food and drugs in various states, and by the public prosecution of a number of firms who had disregarded these laws."

As an example of what might be done in the way of labeling, for instance, instead of "Acetic Acid, No. 8," a label like the following would be desirable:

ACETIC ACID.

So-called No. 8. Spec. grav. about 1.040 at 59° F.
Contains about 29% of absolute Acetic Acid.

Instead of having a label "Phosphoric Acid, syrupy," or the like, something like the following is preferable:

PHOSPHORIC ACID.

Syrupy Tribasic (or Orthophosphoric Acid, made from
phosphorus. Spec. grav. about 1.700 at 59° F.
Contains about 85% of absolute tribasic
Phosphoric Acid (H_3PO_4).

"Since all commercial syrupy phosphoric acid corresponds to this standard pretty closely, the information conveyed by the label will enable the purchaser to calculate, at once, and without hunting up tables of specific gravity and percentage in books, how much acid he will have to weigh out to make a definite quantity, say of a 50 per cent. or of a 10 per cent. phosphoric acid." "When products turned out by a firm are intended to be, as near as possible, always of uniform quality, it will be an easy matter to devise labels, after the pattern above suggested, to be used in place of the present barren ones."

In this connection the following remarks on

Reform in Prescription Labeling may also find place. The "Amer. Druggist," speaking about the faulty character of the labels and labeling of prescriptions, makes some admirable suggestions respecting the manner of labeling prescriptions. Instead of the customary legend "As Directed," which is unnecessary, inasmuch as it is self-understood that a medicine is to be used as directed when specific directions are not given on the prescription, it would be much better to leave a considerable

blank space on the label, into which the necessary directions may be written, if desirable, by the nurse or patient. The printed matter should be limited to the title and location of the dispensing establishment, which in the specimen label communicated occupies one side of the label, the lettering being side-ways, and to the name of the prescriber, number, and date of the prescription, printed in the same way in the space on the other extreme of the label. The center of the label, and the largest space, should be reserved for the direction, the only printing on this portion being the words "Directions," "For," and "Dose," on separate lines, followed by a proper number of blank lines. Respecting the

Management of the Cork of a Vial, it is remarked that the corks are frequently forced into the neck of the vial in such manner that they are twisted off in the effort to extract them; or the cork is too large, and partially disintegrated by the cork press before its introduction into the vial. To avoid annoyance from these sources, the cork should always be removed, examined and reinserted before the medicine is delivered.

Latin in Prescribing.—The "Phar. Era" (July 1888) discussed the question, pro and con, of retaining Latin in prescribing, and in conclusion formulates the following objections to the practice:

"1st. Few prescribers are familiar enough with the Latin language to write a faultless Latin prescription, if we are to judge by the specimens that come to the Detroit drug stores, or those published in current medical periodicals. No attempt is made ordinarily to write the directions in Latin, a practice fraught with obvious danger where prescriber and dispenser are either of them lame in their Latin. There is little danger of misconstruing the meaning of the prescription itself from any liberties it may take with orthography or grammar, but an educated man will not be willing to use Latin at all unless he can write it correctly. 2d. New preparations are continually being introduced for which no authoritative Latin names exist, and the prescriber must either coin a Latin name, or mar the effect of his work by writing part in Latin and part in some other language. 3d. The use of Latin simply to convey an impression that the prescriber is a man of great erudition, savors of quackery; it looks like a cover for ignorance, and the more confidence the man has in his skill in the use of remedies, the less willing is he to resort to the artifices of charlatans."

Pharmacists as Experts.—Among the propositions for the improvement of the conditions of pharmacy, perhaps none is more deserving of attention than that which contemplates the education of pharmacists with special reference to making them experts in matters pertaining to the examination of foods, and to sanitary science in general. Calling attention to the propositions that have been made in this direction, the "Pharm. Rundschau" (Nov. 1887) observes, that while in some of the University laboratories suitable provisions have been made for instruction in this

particular field, the "Colleges of Pharmacy" have, with one or two exceptions, so far completely ignored it. The older generation of pharmacists, who may be qualified in part by their experience or knowledge to carry out these examinations, appear to be indifferent to this innovation, or to oppose it altogether; while the younger generation are liable to overestimate their ability, and are, as a rule, not prepared to do justice to the work. Yet it is to this younger generation that we must look forward to take the initiative, and it appears to be therefore highly important, if not an imperative necessity, that our Colleges of Pharmacy should so extend their courses of instruction—possibly by a post graduate course—as to embrace also thorough training in sanitary science and the examination and analysis of food.

Practical Experience in Pharmacy as a Qualification for Graduation.—The rejection by one of the Colleges of Pharmacy of four candidates for graduation for the reason that these candidates did not have "four years' practical experience in pharmacy," notwithstanding that "one of these four attained the highest average standing in all departments at the final examination," leads the "Pharm. Era" (Sept., 1888), to make some remarks in opposition to this requirement. "Sufficient inquiry leads to the conviction that not one of the colleges of pharmacy takes any pains to find out what *kind* of practical experience its candidates for graduation have had, but they keep on all the same insisting upon a certain quantity of it, whether poor or good. Considering the facts in the case, this requirement appears meaningless and valueless. 'The Era' is as thoroughly a believer in the value of practical experience on the part of dispensing druggists as any one else; it believes that the pharmacist's education is never complete without actual experience in the dispensing store; but as that part of the education is not and cannot be acquired at the college, the college has nothing to do with it. The question of how long he (the graduate in pharmacy) has been behind the counter and what he did there, should be left to the State Board of Pharmacy, or, still better, to his employer, who, if himself an experienced pharmacist, is the best judge. A graduate in pharmacy, although he may be well educated theoretically in all that concerns pharmacy, and may have had ample laboratory training in chemistry, and, for that matter, even in dispensing work, is not necessarily a first-class drug-clerk. But it is safe to say that a graduate of a good school of pharmacy, even if he has never before served in a drug store, will, as a general rule, be found a more valuable clerk after six months' service than an uneducated clerk of four years' practical experience."

In rebuttal of this arraignment of a system prevailing, with apparently one exception, in the teaching colleges and schools of pharmacy of this country, Professor Frederick B. Power (Pharm. Rundschau, Dec., 1888) makes some very pertinent remarks. It is hardly to be presumed that

the views of the "Era" will be generally conceded to be right, while those of a vast number of eminent teachers and authorities, both here and abroad, are all wrong. The "Era" itself admits that practical experience is actually necessary to make competent and reliable pharmacists, and that the pharmacist's education is not complete without actual experience in the dispensing store; but it contends that as that part of his education is not and can not be acquired at the college, the college has nothing to do with it, and that the practical qualification should be determined by the State Board of Pharmacy. Prof. Power observes to this that "it would be quite deplorable if, in the United States, the colleges were not as capable of determining the practical qualifications of their pupils as the State Boards of Pharmacy." It being conceded by the editor of the "Era," that "several years of practical experience form a necessary and indispensable qualification of a proficient pharmacist, is it not highly desirable that the graduates should possess it when endorsed with a degree, which, as conferred by most of the schools, carries with it, to a greater or less extent, an endorsement of the holder's competency as a pharmacist." It is held to be far preferable that the student, who intends to become a practical pharmacist, should have some two or three years at least of practical experience in a well-managed dispensing store, than that this practical training should be deferred until after the completion of a course of study in a college, or a school of pharmacy, and the obtainment of a degree. "That such a graduate would be capable of learning the practical operations of pharmacy more quickly than one totally unfamiliar at the beginning with chemistry, materia medica, etc., there is not the least doubt; but whether his sense of pride would render it altogether agreeable to feel compelled to place himself under the instruction of others in the shop better versed in the art and technicalities of pharmacy, although, perhaps, much less thoroughly drilled in science and devoid of a college degree, seems somewhat problematical."

"The most urgent necessity of our time is not that practical experience shall be ignored and its requirements discarded by the schools or colleges of pharmacy, but that its value should be enhanced and rendered more uniform through the strict demands in the past of pharmacists that their apprentices shall possess at the outset at least as good an education as is obtainable at the grammar schools. It should then be the future duty of the preceptor to guide the course of his apprenticeship by a carefully outlined system of progressive work and private study." Professor Power, in conclusion, "does not by any means maintain that the so-called practical experience, under the existing heterogeneous conditions of pharmacy in this country, has an undisputed or uniform value, or that in some exceptional cases it may not even have a prejudicial influence upon the future student. It is, however, his sincere conviction that when this experience or apprenticeship is of the proper character, and is preceded

by all the requisites pertaining to a good English education, it affords the most substantial foundation for a systematic course of scientific or technical study with reference to the further successful pursuit of the profession of pharmacy. Those schools, colleges or departments of pharmacy feeling the force of this conviction, which maintain the long established requirement of a certain number of years of practical experience in pharmacy as a requisite for graduation, and which have honestly sought to be controlled by such methods as have been elucidated, can therefore not be consistenly charged with perpetrating "a sham and a pretense.'"

Preliminary Education Requisite for Admission to Colleges of Pharmacy.—The "Phar. Era" (December 1888) observes that "no more important and vexatious problem is presented for the consideration of colleges of pharmacy and their faculties than this—how much and of what character should be the preliminary education required of matriculants? The question has been variously answered by the various colleges, the result being that we now have no uniform requirements for entrance; the candidates failing at one institution may easily enter another where the examination is easier; or perhaps, as in some colleges, lacking altogether." After discussing the defects in the requirements of the colleges in this direction, and the causes that may be held responsible, the following is proposed as a remedy: "Let the colleges establish a standard of examination for entrance, sufficiently high to exclude all not of sufficient ability and attainments to do justice to the instruction afforded. It is objected that there will be a great decrease in the number of students. What if there be? It is better to have a few good students than a multitude of numskulls. If a few of the colleges be forced to close their doors, it but proves that they were founded on sand, not upon solid work. But the fear of numerical and pecuniary loss is unnecessary. Records of educational institutions all show that so fast as educational standards have been elevated, just so fast has been the increase in numbers, prosperity, and reputation."

Relation between the Physician and Pharmacist.—The numerous papers that have appeared during the past year upon the relation between pharmacist and physician, is the subject of an editorial in "Phar. Rundschau" (Jan. 1889), in which the opinion is expressed that nothing new has been developed by these papers, and that the vexed problem has not been brought one iota nearer to a solution. While neither medical journals nor medical associations seem to be reluctant in aggressiveness against the alleged and exaggerated encroachment of the druggist upon the legitimate or presumptive domain of the doctor, the pharmaceutical press, for want of courage or ability, has generally avoided as a *noli me tangere* to enter upon disputes of this kind, and upon refuting unwarranted or misdirected charges upon pharmacists as a class. Nor have pharmaceutical writers or editors, for obvious causes, shown adequate spirit and

vigor in controverting silly polemics and unjustified imputations. After referring to some notable rejoinders to meet imputations during the years 1875–1879, the Rundschau draws attention to and endorses the following sentiment in the "West. Drugg." (Dec. 1888). "If physicians insist that druggists cannot dispense any medicines except on a physician's prescription, the public will bring the light of reason to bear on the controversy, and force an equitable settlement in the interest of economy. The trouble with most 'compromises' between doctors and druggists is that they usually fail to make the public a party to their conferences. The public must be educated into a proper understanding of the subject, or it will be very likely to take things into its own hands and scatter professional "ethics" to the winds. Tell a man with the colic that he can have no medicine unless he brings a physician's prescription for it, and he will soon bring the most devoted worshiper of ethics to terms. If you won't supply him, somebody else will, and you have the loss of a customer, perhaps, for your pains, and have gained nothing. A *purely selfish* regulation the public will not tolerate, and such a regulation would be the one which proposes to prohibit druggists from responding to requests for well-known remedies for simple ailments. The most that can be reasonably asked is that druggists shall *not visit the sick nor prescribe in cases requiring careful diagnosis, or in other respects requiring special medical skill.*"

Finally, as a matter of general interest, the following respecting the

Establishment of a Botanical Garden in the City of New York, may find place here. The "Torrey Botanical Club" has issued an appeal with this object in view, which has been printed for general circulation, and in which the utility of such an establishment is clearly brought forward. It is maintained in this appeal that "strictly speaking, a garden of this sort is a scientific and educational institution, quite as much so as a library or a college, and for its foundation and maintenance the public may properly look to the sources from which so many of our universities and libraries have been derived. A garden such as New York City ought to have would fully equal in value such distinguished institutions as Cornell University, Vassar College, or the Astor and Lenox libraries. In a sense it would even surpass them in importance, for it would occupy an educational and scientific field at present very inadequately cultivated in this country.

"Such a garden might be established and maintained by one man of wealth, or by a corporation of citizens. An institution on the latter basis will naturally arise when several men of means shall have made plant collections too important to be lightly dispersed. One, let us say, will accumulate orchids, another palms, a third ferns, and a fourth liliaceous plants. These or similar collections, united by common consent, properly housed and provided with a sufficient maintenance fund, would form the nucleus of an institution essentially horticultural and popular in its incep-

tion, but susceptible, under wise direction, of ultimately attaining a high degree of scientific usefulness. A third method of securing a botanic garden would be by municipal appropriation and under municipal management. The city might, at least, afford valuable aid to the project by giving a site from the lands appropiated for park purposes, and an annual subsidy of fixed amount from the city (or State) treasury would also be an important assistance.

"The uses of a botanic garden may be reckoned as of four sorts. First and foremost is the purely scientific and educational use. Subsidiary to this, but still of a marked degree of importance, are the pharmaceutical and horticultural uses, and lastly, the general use as a place of agreeable resort for the public at large.

"It is obvious that a considerable collection of living plants, arranged with scientific method, and representing with tolerable completeness the various classes and orders of the vegetable kingdom, must be of immense interest and value to every practical botanist. Such a garden as New York might have would speedily become a Mecca for the botanists of America, and for those of the Old World also if due attention were paid, as it should be, to making the representation of distinctively American plants as full as possible. To students of botany in the numerous schools and colleges within a hundred miles of us, such a garden would be of the greatest benefit. Courses of instruction, vividly illustrated by living specimens, could be provided for pupils from New York and its vicinity, and thus a great and desirable impetus might be given to the pursuit of one of the most useful and interesting of sciences.

"Students in medicine and pharmacy approach the subject of botany with a particular object in view. Plants of medicinal value have for them a special importance. With ample means at command, it would be easy to obtain an abundant representation of plants of this nature, without prejudice to the purely scientific character of the garden, thus securing for the institution the highest degree of pharmaceutical usefulness, and making it an invaluable auxiliary to our admirable medical schools."

The "Amer. Drugg." (Feb. 1889), in calling attention to this appeal, observes that not many years since New York had a very creditable botanical garden, founded by Dr. David Hosack, in 1801, and known as the "Elgin Botanical Garden." The question is asked, what has become of this botanical garden, which, founded by Dr. Hosack and purchased by the State, was "committed to the care of Columbia College? It was rooted up. Many of the plants were sent to Bloomingdale Insane Asylum (a branch of the New York Hospital), where, we are informed, some are still to be seen, and Columbia College has leased the ground for building purposes. In 1835 these twenty acres were already valued at more than $100,000. Who can estimate their value now, located, as they are, in the centre of the fashionable part, and of the wealthiest ward,

of the city? In the event of the establishment of another botanical garden here, the experience of the past should lead to some caution relative to the choice of the corporation which is to be its custodian, and Columbia College should at least purchase its site or contribute handsomely to its maintenance. The petition of the Torrey Botanical Club mentions the desirability of securing a site in some of the proposed up-town parks; but it seems to us that the Museum of Natural History having already a magnificent park surrounding it, which, even allowing for future additions to the building, is amply sufficient for the purpose, is the proper body to maintain a botanical garden for the public benefit." Indeed, by a special charter in 1876, the establishment of a botanical garden in connection with the Museum of Natural History is already provided for, though for one reason and another it seems not to have materialized.

PHARMACY.

A. Apparatus and Manipulations.

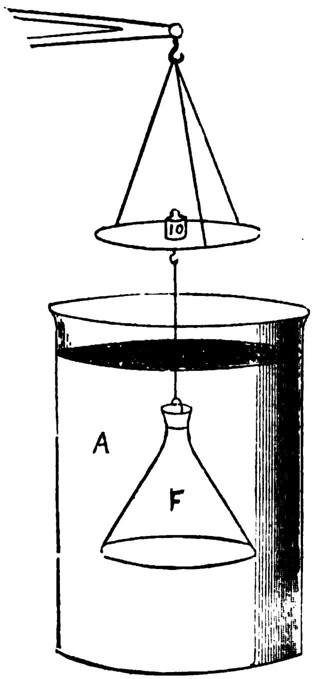
WEIGHTS, MEASURES, SPECIFIC GRAVITY.

Standard Kilogramme—Difficulty in the Construction.— Bertrand reported at a recent meeting of the Academy of Sciences, that the platinum and iridium alloy necessary for the thirty-six international standards had been received from the English firm of Matthey by the Metrical Weights and Measures Committee. The alloy proved to be chemically pure, and to consist of 9 parts of platinum and 1 of iridium, as ordered, but its physical properties left something to be desired, the specific gravity being slightly under the theoretical figures. Microscopical examination also showed the metal to be too loosely grained. In consequence, the alloy was submitted to repeated annealing and powerful hammering until the specific gravity exactly agreed with theory, and could no longer be increased by further treatment. The Commission now consider their metal perfect, and will proceed to execute the standard weights to be distributed.—Amer. Drug., June 1889, 115; from Chem. and Drugg.

Specific Gravity—Simple Method Applicable to Insoluble Substances.—W. H. Symons observes that the process for taking the specific gravity of insoluble substances, usually described in text-books, is unnecessarily complicated. If a sufficient supply is at hand, a block may be cut of suitable size and shape (4×4×1 c. m.) to be held in a wire clip, such as is used for holding watch glasses together. In the case of wax it is best to cut with a hot knife so as to avoid fissures. The substance is weighed first in air and under water, with the clip, which has been previously counterpoised,

while suspended by a fine wire or hair, in water: the temperature is noted, and we then have the required data. With smaller quantities, when the substances are lighter than water, the plan adopted by the author is as follows: A small funnel, *F*, (see fig. 1) is hung by a fine platinum wire to the specific gravity pan of a balance, and counterpoised while floating in water, together with a 10 grams weight placed on the pan. If the substance to be examined is wax, its surface is rendered smooth by holding for a few seconds in a Bunsen flame. The 10 grams weight being removed,

FIG. 1.



Apparatus for Specific Gravity.

the wax is placed in its stead and weights added until equilibrium is restored. The difference between the sum of these weights and 10 grams is the weight of the substance in air. The wax is then held under water in the beaker *A*, and the air bubbles removed by means of a camel's hair brush, an operation comparatively easy with a smooth surface; it is then dipped under the funnel *F*, and is again counterpoised. The excess of weight over 10 grams, added to the weight in air, gives the loss of weight in water, and the specific gravity is deduced in the usual way.—Phar. Jour. and Trans., Sept. 15, 1888, 206.

PERCOLATION, EXTRACTION, ETC.

Percolation—Unsatisfactory Directions of the B. P.—The general directions for percolation in the Br. Pharm. are as follows:—Macerate for forty-eight hours in three-quarters of the spirit, in a closed vessel, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass, continue the percolation with the remainder of the spirit. Joseph Ince criticises these directions unfavorably. He regards the method of previous maceration in a closed vessel and subsequent transference to the percolator as having threefold disadvantage, being: 1. Unnecessary; 2. Wasteful; 3. Messy. He suggests that official sanction should not be extended to a method which the practical pharmacist soon learns to disregard. Every description of percolator can with average intelligence be converted into a macerating apparatus, while the more usual shapes are contrived for the express purpose.—Phar. Jour. and Trans., Feb. 23, 1889, 666.

Percolation—Necessity of Preliminary Maceration.—Prof. J. U. Lloyd criticises Mr. Ince's objections to preliminary maceration as part of the process of percolation. He observes that some drugs swell so decidedly as to render subsequent percolation impossible unless the maceration has taken place before packing in the percolator. To show how powerful this expansion may be in percolators, he mentions that some years ago, a set of six glass percolators were made to his order, ten gallons each. Every care was observed in moistening the powders, and allowing them to expand before packing the percolators, but ultimately each percolator burst from expansion of its contents. Some were shattered into small pieces; others split in a line from top to bottom, the rent spreading half an inch or more; none were broken in handling, and none flew into pieces when empty, as glass sometimes does.—West. Drugg., May 1889, 159.

Percolation—Review of the Process as Understood in the United States.—A paper by G. Marpmann, in "Pharm. Centralh." (Oct. 18, 1888), describing a new form of percolator and the method of its use, shows such complete unfamiliarity with the simple process of percolation as practiced in this country, that C. Lewis Diehl considered it useful to communicate, for the benefit of European pharmacists not familiar with the process, a review of the process of percolation as understood on this side of the Atlantic. The paper, which brings little if anything that is new to American pharmacists, may be referred to in Pharm. Rundschau, February and March 1889, 25–29 and 60–65.

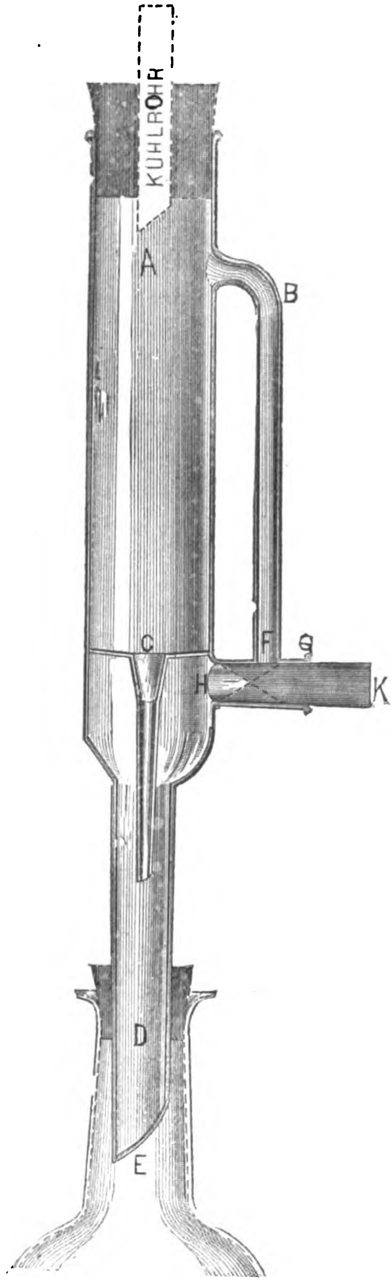
Extraction Apparatus—Improved Construction.—Barthel's Extraction apparatus is figured and described in "Pharm. Post" and in "Western Druggist," June 1889, p. 210:

"A roomy glass tube elongated by heating over a flame, penetrating at

its lower end a cork which fits into a small flask, and closed at its upper end by a cork perforated by four holes, serves as receptacle for the substance to be extracted. Three of the holes in this cork give passage to thin-walled glass tubes from 1 to 1½ meter in length, which at their further end are once more connected by a flat cork to give additional support. The fourth hole gives passage to a glass tube which connects the extractor with the small flask that contains the extracting fluid. The connection consists of two parts whose ends are closely fitted together and held in place by a piece of cork in case of ether or chloroform extraction. In case of alcohol extraction a piece of rubber tubing will answer the purpose. In order to prepare the apparatus for use, the last named uniting cork is moved in either direction so that the ends of the glass tube may be liberated, then the cork holding the three tubes removed. The tube which is to hold the substance, is then closed by a plug of cotton of about 2 cm. depth, whereupon its density is tested by introducing a quantity of the extracting liquid; this latter should escape in quantities of less than 3 or 4 drops a second. The substance to be extracted is then introduced and the apparatus properly closed. It is then attached to the flask, which is supported by a clamp and adjusted over a water bath. In a short time the developing gases will rise in the thin tubes, will be cooled off in the three-tube system, and evenly moisten and extract the drug. The process is regulated by increasing or diminishing the distance between the flask and the water bath. The apparatus described is preferable to the "thus far probably most perfect Soxhletic extracting apparatus," for the reason that it is less friable, and in case any part does break, it can be easily replaced by any one possessed of moderate skill.

Ether—Extraction Apparatus—Practical Construction.—Professor F. A. Flückiger describes the apparatus shown in the accompanying cut (Fig. 2,) which has the advantage over similar apparatus, in that the ether-vapors may be passed through the powder to be extracted from below, condensed above the powder, and then caused to percolate through the powder with great force by rapidly cooling the flask or recipient. By repeatedly treating the powder in this way, its extraction is more rapid and complete than by some other methods. The apparatus requires very little explanation. The extraction tube A is provided at C with a diaphragm, from the centre of which a small tube or neck extends into the funnel D. The tube B, F, attached to the side, passes into a tubulure *G*, which is provided with an ordinary cork *K*, cut standing, by means of which communication through the tube B F, between the upper and lower portions of the apparatus, may be cut off or established. On boiling the liquid in the flask, the vapor passes from *E* through *D* and C, into the layer of powder, communication being open. If the condensed liquid is to return through the powder, communication is closed by turning the cork in *G* so that the opening at *F* shall be

FIG. 2.

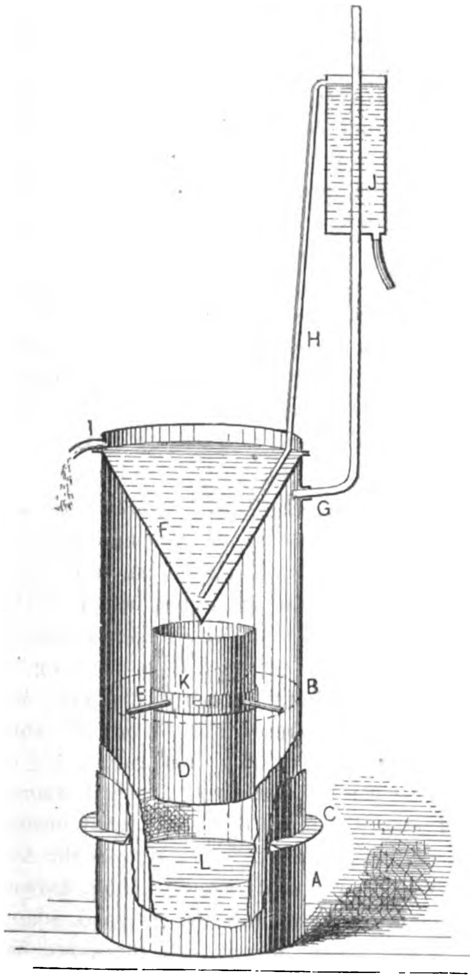


Ether Extraction Apparatus.

closed, and then cooling the flask. The cork possesses the advantage over a glass stopper that it never becomes wedged in so tight as to be immovable, and it is easily replaced by another as may be necessary from time to time.—Arch. d. Phar., Feb. 2, 1889, 162–164.

Extraction Apparatus—Construction Suitable for Hot Solvents.—Charles W. Phillips describes the continuous extraction apparatus shown

FIG. 3.



Extraction Apparatus for Hot Solvents.

by Fig. 3, suitable for extraction with hot solvents, and large enough to operate upon one pound of drug.

"*a* represents the outer cylinder, and is 8½ inches in diameter and 7

inches high, with a circular flange 1 inch wide 4½ inches from the bottom, which serves as a support when the apparatus is set into the hot air pipe. *b* represents the inner cylinder, which is 20 inches high, and goes to bottom of cylinder *a*, fitting snugly. *d* represents the percolator, which is simply a cylinder 4¼ inches in diameter and 7 inches long, open at both ends, but wired on the inside at the bottom in order to support the perforated plate, which can be covered with flannel or muslin and fit inside and be taken out for cleaning. Another perforated plate of the same size lies on top of the drug, but need not be covered. *e, e, e, e*, represent the wires soldered to the inner cylinder, and serve to support the percolator, which has two small projections that are locked into the ring. *f* represents a funnel-shaped condenser which is seven inches deep. *g* represents an opening in the cylinder *b* which serves to allow the air to escape when setting up the apparatus, and also for the introduction of a pipe by means of a perforated cork and connected with the condenser *j*, which serves to condense any vapors that have escaped the condenser *f* and return the liquid to the apparatus. The condensing water from *j* can be run by the pipe *h* into the condenser *f*, thence through the pipe *i*, to the drain. The vapor from the liquid *l* will rise, condense on the condenser *f*, adhere to the sides of the condenser, run down and drop into the percolator *d*, which being entirely surrounded by the hot vapor, the extraction is accomplished almost at a boiling heat."—Phar. Rec., May 20, 1889, 160.

Continuous Percolator—Construction Suitable for Extractions with Alcohol.—J. F. Liverseige describes a continuous percolator which he has constructed for the purpose of extracting jalap by hot percolation with alcohol. He describes the apparatus, which is shown in the cut (Fig. 4.) as follows: It consists of two distinct pieces, the outer part A being a piece of ¾-inch glass tubing 4½ inches long, to the bottom of which is joined 1 inch of tubing ¼ inch in diameter, with the end cut off obliquely (by a file moistened with a solution of camphor in turpentine); the inner part B is a piece of ¼-inch tubing 3¾ inches long, the bottom being turned out into a flat dish ½ inch in diameter.

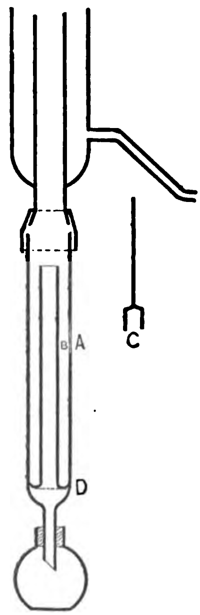
For the assay of jalap, the inner tube was placed inside the outer, and a little absorbent cotton D pressed into a ring at the bottom by a glass rod; a small glass cap, C, made of ⅜-inch tubing, drawn out, was placed over the top of the inner tube, and the weighed jalap (1 or 2 grams), mixed with sand, was put uniformly into the space between the tubes from a piece of paper; any jalap resting on C was sent down by a brush, and C was removed.

The apparatus was connected by a perforated cork to a weighed 100 cc. flask with a short wide (1 inch) neck containing methylated spirit, and the jalap, which should occupy about half the tube, was wetted with spirit, and packed in the percolator. The flask was placed on a water-bath, and the tube connected by rubber tubing to an inverted condenser.

The temperature of the bath may require regulating slightly, so that the alcohol condensed is about equal to that which flows through the jalap and wool; the jalap should always have about ⅛ inch of alcohol over it.

When the temperature is once adjusted, it requires no further attention till extraction is finished, which is in about two hours. At the end of that time the flask is removed, hot water added, and the alcohol evaporated off on the water-bath, during which process most of the resin sticks to the side of the flask. The aqueous extract is decanted, the resin in the flask washed with hot water and drained, the flask is placed on its side in the water oven, dried till constant, and weighed. An improvement would be to decant through a weighed filter, dry, and weigh the filter

Fig. 4.



Continuous Percolator.

with the small portion of resin on it. If there is any doubt as to the perfect extraction of the resin, it is advisable to attach a second flask and extract another half-hour. The advantages of this apparatus are:

Simplicity.—Any one with a little skill in glass-blowing can easily make it.

Strength.—There are no fragile tubes inside or out to be broken off.

Efficacy.—The jalap is nearly at the temperature of boiling alcohol, and practically all the alcohol vaporized passes through it.

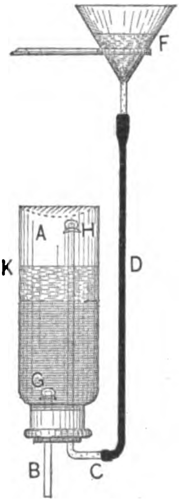
Economy.—There is no loss of alcohol in extracting.—Pharm. Rec., March 4, 1889, 66, from Chem. and Drugg.

Extraction by Pressure—Superiority over Percolation.—Charles Symes has contributed a paper to the British Pharmaceutical Conference, in which he brings forward the plea of depending rather upon the operation of pressing than on that of percolation in the extraction of certain drugs. Restoration of moisture to the dry drug, and subsequent expression, Dr. Symes considers to be the treatment specially adapted to leaves—of which senna is a type—where there is bulky material and a danger of injuring the active principle if percolation and evaporation be adopted. The plan recommended for senna is to digest the leaves for from four to six hours in a covered vessel with a mixture of equal parts of rectified spirit and water, in the proportion of a pound of leaves to sixteen fluidounces of menstruum; afterwards to put the mixture into bags and subject it to pressure of fifty tons or more, until it ceases to yield liquid. The marc is then broken up, water added, and pressure again applied, until the product amounts to sixteen fluidounces for each pound of leaves used. In this way, according to Dr. Symes, a very active preparation can be obtained, and *Convallaria Majalis*, *Damiana* and *Hamamelis* are instanced as suited for treatment upon the same principle.—Yearbook of Pharm., 1888, 356–363.

New Pressure Percolator— Construction.—C. W. Phillips describes a new form of pressure percolator, which is shown by the accompanying cut (Fig. 5). It will do the work of the most expensive apparatus at a trifling cost, and may be erected in any laboratory. An ordinary bottle, A, with moderately wide mouth, is fitted with a good cork suitably perforated for two glass tubes B and C; B is a short tube which has been covered at the point G with a small piece of muslin before being inserted in the cork. This serves for a strainer. The tube C goes nearly to the bottom of the bottle, and at H has a piece of muslin tied over it. The tube C is bent at right angles at C and connected with the rubber tube D, and that with the funnel F. The amount of pressure is limited only by the length of the tube D, and the strength of the bottle A. There are no leaky joints, common to most pressure percolators, and no metallic surface to contaminate the percolate. To operate the percolator successfully, proceed as follows: Select a bottle large enough so the amount of drug to be operated upon will fill the bottle not more than two-thirds full. The moistened powder is then introduced into the bottle loosely, and the tube C with its muslin cap H is carefully pushed through the drug, and the perforated cork carefully and firmly pressed into the bottle. There is scarcely any danger of a leak at the cork, as the open tube B relieves the pressure right at this point. The bottle is then inverted, as shown in the figure, and the powdered drug packed as firmly as possible by shaking and jarring against the hand. The

rubber tube is then attached and the menstruum allowed to enter. The liquid will never fill the percolator, as there is no possible chance for the air to get out, but it will rise to some point, K, entirely covering the drug. The menstruum must pass through the drug before it can escape at the tube B. By having a closed reservoir F, and a tube connecting with the receiving vessel, the tube B also entering the receiving vessel

FIG. 5.



Pressure Percolator.

through a perforated cork, there can be no loss from evaporation, and this percolator may be used for ether or any volatile liquid.—Phar. Rec., July 16, 1888, 213.

FILTRATION, ETC.

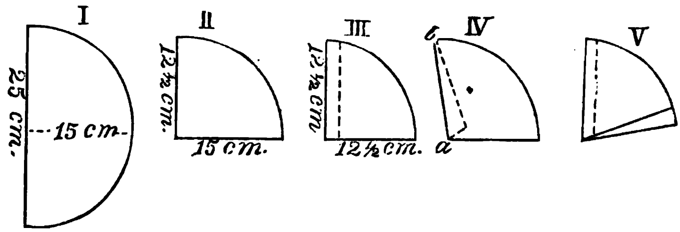
Filtration—Use of cotton as an aid in certain analytical operations. A. B. Clemence, speaking of the tediousness of filtration in connection with the estimation of silicon in pig iron, describes a filter, by means of which he has overcome the difficulty, as follows: A 3-inch filter paper is folded as usual, and the apex cut off, leaving a hole about ⅛-inch in diameter; a wad of cotton (the absorbent cotton of the druggists) is pressed into the apex, and when wet, may be, either with a pump or by the mouth, pressed tight enough to hold the residue. Even without a pump this filter will run so fast that close watching will be needed to keep the funnel full. Wash as usual, with hot dilute hydrochloric acid and hot water, when the residue, cotton and paper, is ready for the weighed crucible. Burning with a blast-lamp completes an estimation in forty minutes from the time of weighing the borings. The weight of the ash of the cotton will of course vary with the amount used, while that of the paper will be the same in each case, but it never need be more than

0.0005 grm., and this small amount may be disregarded when working on silicons for Bessemer charging.—Chem. News, Oct. 12, 1888, 178; from Journal of Analytical Chemistry, Vol. 1, part 3, 1887.

Filtration—Use of Asbestos.—W. Fresenius states that liquids containing very finely divided matter in suspension, may readily be brought to settle by shaking them up with asbestos.—Zeitsch. f. Anal. Chem.. xxvii, Part I; Ch. News, July 27, 1888, 48.

Filters—Economical Construction.—Edo Classen suggests some improvements on the construction of filters, originally proposed by Rother, and of practical value as an economical use of expensive filter paper in analytical work. Patterns (corresponding with the size of the filters wanted, for instance with such having a radius [semi-diameter] of 12½, 17½, 22½, 27½, 32½, 37½, 42½, 50, 60, 80, and 100 centimeters) are constructed from circular discs of tinned sheet-iron of the same size by cutting off somewhat more than one-half the disc (see fig, 6,) through a

FIGS. 6–10.



Folding Filters.

point distant from the edge 15, or respectively 21, 27, 33, 39, 45, 51 60, 72, 96 or 120 centimeters. The small section of the disc, if of no use for smaller patterns, may be rejected. Such a pattern is placed on a sheet of paper, a piece of which is then cut off by allowing the scissors to go round on the edge of the tinned iron. This piece is now folded once in such a manner that one part entirely covers the other (fig. 7). It is then folded so far on the straight open side, that both the straight sides now present are of equal length (fig. 8.) The narrow folded part (2½ centimeters wide, if a filter of the smallest size above mentioned is to be made) is folded once more, after which operation the filter is ready for use. If the funnel on hand should happen to have a larger angle (be wider) than 60°, the filter may be easily adjusted by folding the narrow part in the direction from *a* to *b* (fig. 9); if, however, the angle of the funnel should be smaller than 60°, the filter may be made to fit by folding the closed side in an oblique direction, as shown (fig. 10). By making filters in this way, two-fifths of the paper necessary for ordinary fil-

ters are saved; but three sheets are used instead of five, a matter of importance, and therefore to be taken notice of.

It is obvious that this kind of filters will suit also for pharmaceutical work in all cases which allow or require the use of a plain filter.—Amer, Jour. Phar., Feb. 1889, 74-75.

Filters—Avoidance in Analytical Weighings.—Professor de Koninck calls attention to the advantage of a method long ago recommended by Prof. Fresenius, by which the weighing of filters containing precipitates may in many cases be avoided. It is well known that the drying of filters to a constant weight and the keeping of them dry during weighing is often difficult. Besides, when the precipitate is to be ignited with the filter, it is sometimes impossible to prevent the reduction of a part of the precipitate, whereby loss is incurred.

The remedy proposed is to wash the filter with a liquid which will completely dissolve the precipitate, and which will not bring into the resulting solution any substance that cannot be driven off at the temperature to which the precipitate proper would have to be exposed.—Amer. Drugg., Dec., 1888, 227.

Filter Paper—Linen Lining.—Despite the progress made in all departments of chemico-pharmaceutical technics, paper still continues to be the most available means of filtration, and the efforts of its manufacturers for this purpose have been chiefly directed to improvements in the material itself. To prevent its too easy tearing, especially when used in large sheets, various processes have been devised. It has been proposed, for instance, to convert either the whole or a part of the paper into parchment by steeping it in nitric acid, but this, of course, would render the passage of fluids more difficult. E. Apian-Bennewitz (Pharm. Zeit.) lines his filtering paper with a thin, wide-meshed linen fabric, which makes it much more durable without impairing its permeability. In folding it for use, the linen side must, of course, be turned outwards.—Drugg. Circ., April 1889, 78.

Paper Pulp—Pharmaceutical Uses.—John C. Falk describes a variety of uses to which paper pulp may be put for clarifying liquids or rendering otherwise unmanageable substances soluble in aqueous fluids. He gives working formulas for different aromatic waters, for clarifying muddy water, honey and simple syrup, for medicated syrups of various kinds, such as tolu, ginger, orange, compound squill, and for different elixirs.—West. Drugg., Oct. 1888, 351, 352; from Proc. Mo. Phar. Assoc.

Powdered Filter-Paper Stock—Utility.—Referring to the above paper of Mr. Falk, Adolph G. Vogeler observes that paper pulp would doubtless be used to a greater extent if it were not for the preliminary trouble of preparing it. He suggests that a demand for filter-paper stock, ground to powder, might induce manufacturers to supply it.—Ibid., Feb. 1889, 44.

Clarification—Practical Observations.—Eugene Dieterich makes some practical remarks upon the process of clarification. One of the best agents for this purpose is albumen. When clarifying vegetable extracts, the albumen which is naturally present in most plants accomplishes the purpose easily, provided the vegetable matter is extracted in the cold, so as to get as much albumen as possible in solution.

Egg-albumen may also be used. The effect of albumen may be increased by the addition of cellulose, in form of a fine magma of filtering paper. This has the further advantage that the subsequent filtration is much facilitated.

Suspended particles of gum or pectin may be removed by cautious precipitation with tannin, of which only an exceedingly small amount is usually necessary. It combines with the gelatinous substances better with the aid of heat than in the cold. There must be no excess of tannin used.

Another method of clarifying liquids, turbid from particles of gum, albumen, pectin, etc., is to add to them a definite quantity of alcohol. This causes the former substances to separate in more or less large flakes. The quantity of alcohol required varies greatly according to the nature of the liquid. It should be determined in each case by an experiment on a small scale.

Resinous or waxy substances, such as are occasionally met with in honey, etc., may be removed by the addition of bole, pulped filtering paper, and heating to boiling.

In each case, the clarifying process may be hastened by making the separating particles specifically heavier, that is, by incorporating some heavier substance, such as talcum, etc., which may cause the flocculi to sink more rapidly, and to form a compact sediment.

Clarifying Powder for Alcoholic Liquids.—

Egg-albumen, dry	40 parts.
Sugar of Milk	40 "
Starch	20 "

Reduce them to very fine powder, and mix thoroughly.

For clarifying liquors, wines, essences, etc., take for every quart of liquid seventy-five grains of the above mixture, shake repeatedly in the course of a few days, the mixture being kept in a warm room. Then filter.

Powdered talcum renders the same service, and has the additional advantage of being entirely insoluble. However, the above mixture acts more energetically.—Amer. Drugg., Nov. 1888, 211.

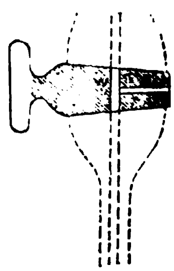
Funnel—Improved Construction for Filtering.—Witte having suggested perforated discs of glass, porcelain, or other material to be introduced into funnels so as to enhance the filtering surface, Dr. Hirsch has now introduced an additional improvement, consisting in the sides of the funnel

being made straight, and the diameter of the place where the perforated plate is to rest being made larger. These funnels are made of porcelain. When these funnels are used, a sheet of filtering paper or other suitable material is laid upon the perforated disc so that the interior of the sides is also covered, for which purpose folds will have to be made in the filtering paper. If the vacuum pump is to be used, the filtering paper must be of sufficient strength to withstand the pressure. Additional support may be given to the paper by putting below it a layer of purified cotton or asbestos.—Amer. Drugg., Jan. 1889, 5.

Funnel—Improved Construction for Suction Filtering.—Dr. Ernst Buchner describes two funnels, which are improvements on the "Hirsch" funnel. Both forms are made either of porcelain or of metal. One consists of a filtering sieve, which is inserted into the glass receiver by means of a cork. This receiver is connected with the suction pump by a tube, and the opening is protected by tin. The lower tube is closed with a rubber cork, and the receiver may be emptied by the tube without disturbing the sieve. This filtering sieve allows of very rapid filtering, and has the advantage over the funnel-shaped one that it offers a larger surface, and at the same time greater stability. Two or three thicknesses of filter are used. When filtering cloth is used, a hard rubber ring is necessary to keep the edge of the cloth in position.—West. Drugg., Feb. 1889, 48; from Chem. Ztg. See also Proceedings A. P. A., 1865, p. 178.

Separating Funnel—Cheap Construction.—Currier has devised a separating funnel, which is readily and cheaply constructed, as follows: Through a cork inserted into the neck of a funnel, a glass tube is passed, the inner end of which is closed by fusion, and which has an opening—

FIG. 11.



Tap for Separating Funnel.

made by a file—a little below the closed end. If this tube is pushed down so low that the opening is covered by the cork, nothing will flow from the tube. On pushing it upwards, the hole becomes uncovered and will permit the passage of liquid through the tube.—Amer. Drugg., July, 1888, 132.

Separating Funnel—Improvement in the Tap.—W. H. Symons observes that in small separating funnels the diameter of the tube below the tap is often so small that a column of aqueous liquid is tenaciously retained in it, but when ether passes the tap its cohesive force is so small that the column breaks, and carries with it a portion of the ethereal liquid which it may be desired to retain. If, however, a groove *G* (see fig. 11) be filed in the plug at right angles to the "way" *W*, air is admitted to the tube below whenever the tap is shut, and so any liquid it may contain runs out. The use of the tap is in other respects in no way interfered with, provided it is always turned off in the right direction.—Pharm. Jour. and Trans., Sept. 15, 1888, 207.

Wash Bottle—Automatic Arrangement.—J. F. Jones describes an automatic wash bottle, consisting of a flask and its fittings, which are just the same as those of an ordinary wash bottle, with the exception of two valves. One of these is placed at the end of the air-tube. It is a "Bunsen valve," which consists of a piece of rubber tubing, placed over the end of the glass tube. The lower end of the rubber tube is closed with a piece of glass rod. In this rubber tube there is a slit cut, which will allow air to pass into the flask, but will not allow it to pass out. The pressure of the air is thus increased in the flask, and an equilibrium can only be restored by water flowing out through the delivery tube. In order that this flow may be stopped when desired, another valve is designed, consisting of a glass tube, into which a small wooden rod is placed. At the lower end of the rod is a disk, which fits over the end of the glass tube, and to make it fit air-tight, is provided with a rubber washer. This disk is held tight against the tube by a small spiral spring. After blowing air in, and causing water to flow from the delivery tube, equilibrium can be at once restored, and the flow of water stopped, by simply pressing on a button. It is a very convenient piece of apparatus, as it saves the trouble of blowing during the whole time of washing a precipitate. By applying the mouth once, enough pressure can be obtained to keep the stream flowing for some time.—West. Drugg., May 1889, 165.

APPLICATION OF HEAT, ETC.

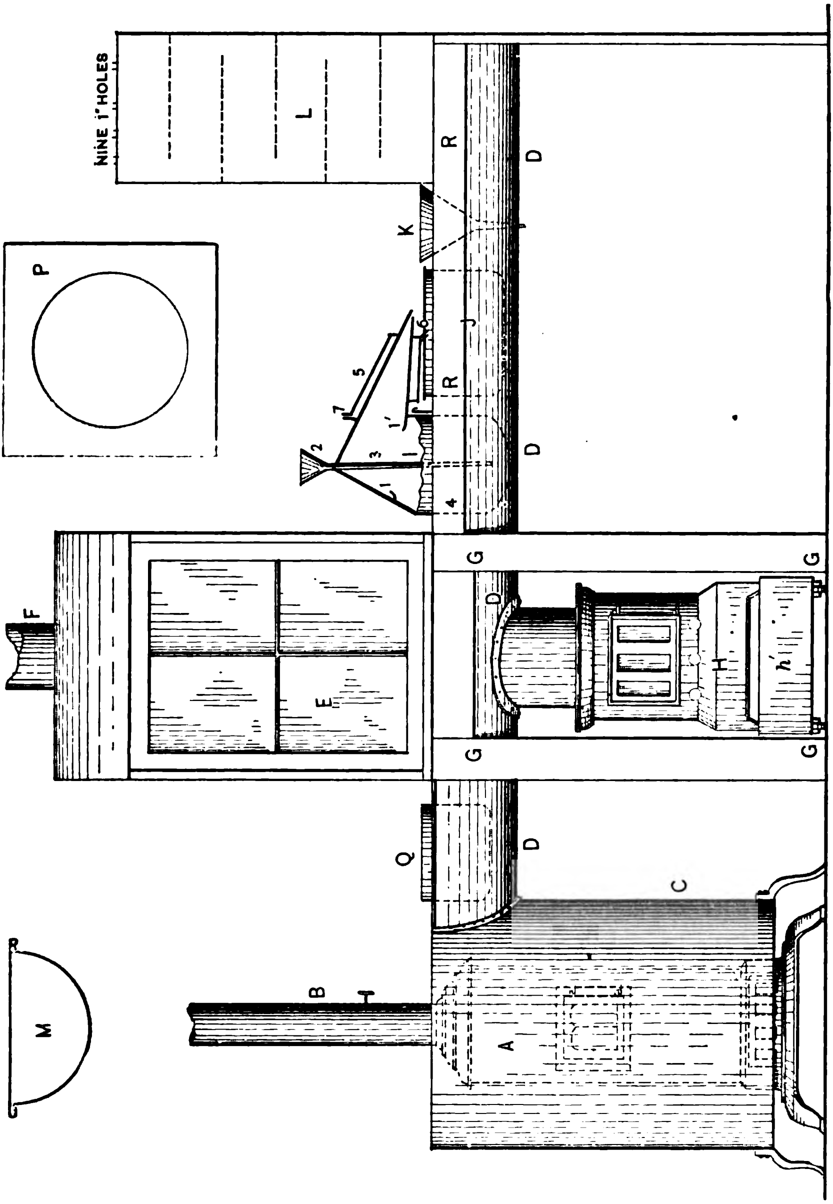
Hot-Air Apparatus for Pharmaceutical Work.—Charles W. Phillips describes a hot-air apparatus for general pharmaceutical work, which is shown in the cut (Fig. 12), as follows:

A represents a heating stove, either a sheet-iron or a cannon stove being best adapted to the purpose. If this stove could be down-stairs and not on the same level, as represented, the hot-air being conducted up after the manner of a hot-air furnace, it would work still better.

B represents the stove-pipe connected with the chimney. This is made to fit neatly where it passes through the drum, so as not to allow the hot air to be wasted.

C represents the drum, which is raised several inches from the floor and open at the bottom, so the hot air will ascend and start a current

FIG. 12.



Hot-Air Apparatus.

through the entire apparatus. The top of the drum being flat, can be used for heating beakers, evaporating dishes, etc., if desired.

D, a semi-circular pipe for conducting the hot air horizontally.

E, the fume-chamber, which is connected with the chimney by the pipe F. The back of the fume-chamber contains a large pane of glass, and should be placed near a window; the front contains a sliding sash supported by a pulley, so that it can be raised or lowered at will. The front and back of the fume-chamber being of glass, the progress of any operation can be watched without disturbing the heat or filling the air with foul odors.

G, the lower part of the fume-chamber, which is inclosed like a closet, the front door of which has been removed in the cut. The object in having it closed is to protect the oil-stove from currents of air, and thus prevent it from smoking. In this way the doors and windows of the laboratory can all be opened if desired, a very important item in hot weather.

H, the oil stove, which is one having three 4-inch wicks, and is connected by a 7-inch pipe to the horizontal pipe. The oil stove is set on a small box, h^1, fitted with rollers at the bottom, so that the oil stove can be easily rolled out for filling.

I and J are stills that are made to set part way down into the horizontal pipe. The top has been removed from still J in the cut, and still I has been turned sideways in order to show its construction. The outer part of the still I is the same construction as the still J, only smaller. The condenser cylinder slips snugly down into the outer cylinder to the bottom, as represented by Fig. 4, thus forming a water-joint. Fig. 1 represents a shallow gutter around the inside of the still-head, which serves to collect any liquid that may condense on the top of the condenser before it reaches the beak, and runs it out with the rest of the distillate, thus materially hastening the distillation. Figs. 2 and 3 represent a funnel-tube reaching to within a half-inch of the bottom of the still, being soldered tight at the top. Fig. 5 represents a condenser, Fig. 6 the influx-tube, and Fig. 7 the overflow. The condenser is soldered perfectly tight to the beak, and the tubes 6 and 7 are made of lead pipe. The advantages of a still of this construction are:

1. It is easily taken apart and cleaned.
2. It requires no luting.
3. It can be replenished by means of the funnel-tube without taking down the apparatus.
4. In making fluid extracts, owing to its round bottom, the residue is always obtained in a compact mass.

K represents a hot funnel, which is simply a glass funnel inserted in a 6-inch hole in the flat part of the hot-air pipe D and a 1-inch hole in the lower part of the pipe. When not required for filtering, the funnel can be removed and the hole covered with a piece of sheet-iron, or it can be used for a small evaporating dish, or any other purpose. L represents the

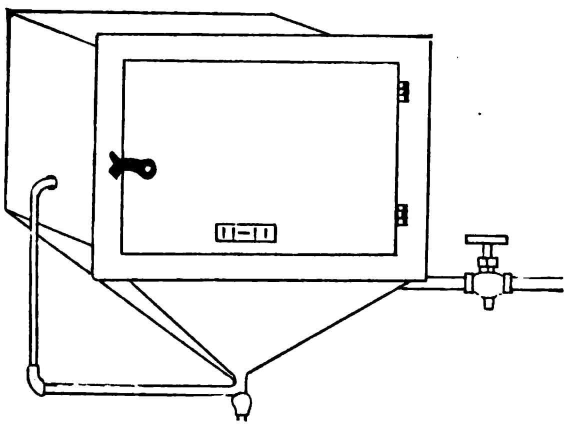
drying-oven, showing a sectional view, the side being removed. Being at the end of the apparatus, it is always ready for use without extra expense. The oven can be made of wood, with a pane of glass at the back and a sash door in front. The top should have eight or nine 1-inch auger-holes to allow the hot air to escape. The draft can be regulated by inserting one or more corks as required; one of the holes will serve for the introduction of a thermometer through a perforated cork.

M represents a sectional view of the horizontal pipe. It is simply a 24-inch piece of sheet-iron bent into a semicircle with a flange, N, on each side. The diameter is then about 15 inches and the depth about 8 inches, which is a very convenient and inexpensive size. The flange N is supported on either side by a bar of wood, R, which sustains all the weight of the stills, etc. O shows the manner in which the sheet-iron plates are secured on top of the apparatus.

P shows a sheet-iron plate for the fume-chamber. This plate is 22 inches square, with a circular hole 15 inches in diameter, and will accommodate a 3-gallon evaporator. Separate plates having circular holes 6, 7, 9, 11 and 13 inches in diameter will be found much stronger and more convenient than concentric rings, and will accommodate any evaporator from a half-pint up.

Q can be used as a sand-bath, water-bath or water-still, but is generally too hot for fluid extracts.—Pharm. Rec., May 20, 1889, 148.

FIG, 13.

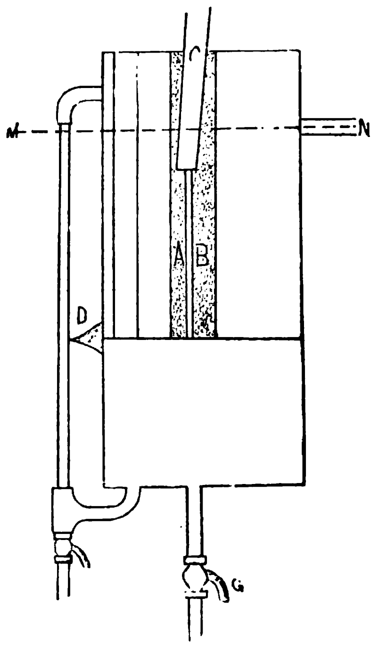


Drying-Oven.

Laboratory Drying Oven—New Construction.—A. J. Banks observes that in laboratories where steam is used for the purpose of heating drying-ovens, evaporating-pans, etc., the water produced by the condensation of the steam is a frequent and troublesome annoyance. The supply

pipes very often have to be carried a considerable distance before reaching the laboratory, and are not unfrequently exposed to strong draughts of air; hence considerable condensation of the steam is brought about, and, in conjunction with that produced by the expansion of the steam on entering the oven, and the larger surface there exposed, the amount of water produced is a serious obstacle to the attainment of high temperatures. With the object of overcoming this difficulty, the author has devised a modified form of water-oven, which answers admirably. Its construction will be readily understood from the accompanying cuts (Figs. 13 and 14) which represent an ordinary drying-oven, with the bottom of the outer covering in the form of an inverted pyramid, provided with a gauge-glass to indicate the height of the water, and a stop-tock or valve for running off the same. The inlet pipe is placed immediately below the inner case.—Chem. News, Aug. 3, 1888, 54.

FIG. 14.



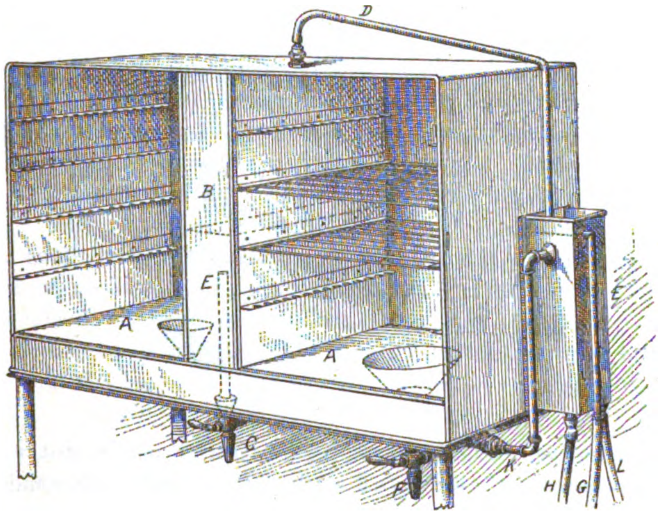
Water Separator (from steam for drying oven).

Drying Oven—Combination with a Water Still.—Prof. Emlen Painter has devised the drying oven and water still shown by the accompanying cut (Fig. 15). It is made of galvanized iron, except the condenser and its fittings, which are block tin, the iron water supply pipe, and an under bottom of copper. As the illustration is drawn to a scale, it can be made

to any size that may be desired ; in this case it stands over the water sink, the support being a framework of gas-pipe.

In the illustration the doors of the drying closet are removed, that the internal construction may be shown, revealing supports for glass shelves or open racks. A drying closet, at the bottom of an opening (which can be closed by a piece for it) in each closet, is adapted for hot filtration.

Fig. 15.



Drying Oven.

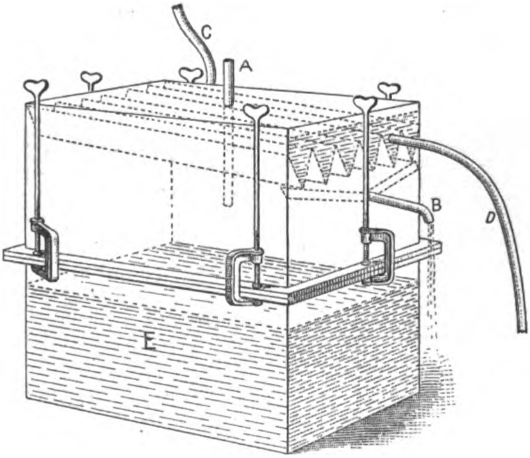
At the right side is the condenser, into which cold water enters ; an overflow provides for the excess of water being safely disposed of; at the same time another pipe carries a portion of it within the water jacket, which is underneath and extends upward between the two drying closets. Heat is applied by one or two large Bunsen burners. The steam escaping is condensed and escapes at the top. At the same time all parts of the apparatus receive their due proportion of heat for the work desired. The pipe and faucet draw off hot water at a height which gives it free from sediment, while at the bottom the entire water space may be emptied when desired. The outer surfaces are covered with thick asbestos paper, which prevents radiation of heat. Mr. Painter suggests that if the water space was made less capacious than in this, it is possible it might yield a large proportion of distilled water and have quicker heating capacity from the same consumption of gas.—Pharm. Rec., Jan. 7, 1889, 2.

Pharmaceutical Still—New Construction.—Prof. W. G. Gregory describes a new pharmaceutical still, which is shown in the accompanying cut (Fig. 16).

The oblong form is used, as best suiting the source of heat, an oil stove.

The body of the still is made of copper, 12 inches wide, 15 inches long, and 5 inches deep, joined without solder, so no injury will ensue if accidentally allowed to run dry. A brass flange is attached to the upper edge, to make surface for rubber packing to secure a vapor-tight joint.

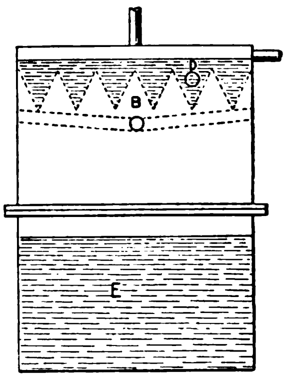
FIG. 16.



Pharmaceutical Still.

The inner surface, exposed to all liquids placed in the still, is nickel-plated—an inexpensive protection when not polished. The condenser is of the same general shape as the body. A corresponding flange is attached to its under edge, and when set up rests on the body flange.

FIG. 17.



Pharmaceutical Still; Section.

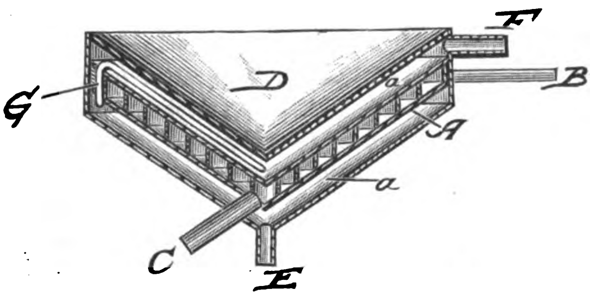
These are held by small clamps with thumb-screws, elongated so the thumb-piece comes above the condenser as shown, and can thus be large enough to afford a strong pressure on the rubber packing between the flanges. The condensing surface is a copper plate bent into the form of

a series of V's, one end being higher than the other. At the lower end a trough is provided to collect the distillate, which is discharged as shown at *B*. It is believed that in the presence of copious vapor the condensing surface will be uniformly wet and the condensed liquid flow continuously toward the exit, so little or no loss will occur at the downward angles by dripping, as would be the case if condensation took place as it does on a window-pane, gathering in drops and trickling down in small streams. The upper surface of the V's is kept covered with cold water supplied through the rubber tube *C*, which connects with a brass tube passing across the refrigerated surface at its highest point. The brass tube is perforated on the under side immediately over each V, so the cold water is forced to the bottom of each one, and then flows to the other end of the condenser, where it passes out of the overflow *D*. The tube *A* allows the still to be charged during use, and extends well below the condensing surfaces.

Half a gallon of distilled water per hour can be obtained continuously at a cost of about 4 cents a gallon for heat. One feature of the still which is valued highly is the ease with which every part can be reached and cleaned, making it available for liquids or solutions which otherwise we would not venture to put into a still. It can, of course, be used in a water-bath, if desired.—Pharm. Rec., May 6, 1889, 133.

A New Condenser, which is very compact and ingenious in its construction, has been devised by Prof. J. U. Lloyd. It is shown in the accompanying cut, (Fig. 18) which represents a vertical section of the

FIG. 18.



New Condenser.

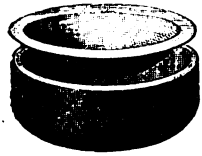
condenser. The condensing chamber is preferably constructed of an inverted cone-shape, but may be made of any other desired form. At its upper end it is provided with an inlet *B* for the entrance of the hot vapors to be condensed, and at its lower part, with the outlet *C* for the escape of the condensed liquid. The interior of the condensing chamber may be perfectly smooth, but is preferably provided with a suitably arranged ribbon or flange extending from the top of the condensing chamber to the

exit *C*. An outer chamber or jacket, *D*, preferably corresponding to that of the condenser, surrounds the latter in such a manner as to leave a space between the two for the circulation of a stream of cold water, which is supplied through the tube *E* projecting into said space, while the tube *F* serves as an exit for the heated water during the process of condensation. The water chamber, at the under side of the condenser, connects with the corresponding chamber at the upper side by means of a tube *G*, which establishes communication between the two. The stream of water passes from the lower chamber to the central part of the upper one, and there spreads out in a thin sheet over the upper surface of the condenser before passing out of the exit. Thus the outside surface of the vapor space is subjected to a continuous current of cold water, in a thin stratum, and a complete condensation of the vapor thus attained. This new form of condenser is distinguished by its compactness and by its requiring so little space, while at the same time it presents to the vapors of volatile liquids a very large surface which is kept constantly cool. The condenser may be hung out of the way, in any convenient place; all that is necessary is to connect the mouth of the still with it.—Amer. Drugg., Nov., 1888, 201–202.

Safety Retort for Generating Gases.—N. von Klobukow recommends a new form of retort to be used for the preparation of gases which are liable, under circumstances, to become dangerous to the operator. It consists of a shallow vessel provided with a grooved flange, into which the lid, bearing the exit tube bent at right angles, fits snugly. All parts are made of malleable iron. The joint is made tight by filling the flange with a mixture of 100 parts of sand (of medium fineness) and 50 to 60 parts of plaster of Paris made into a thick paste with water, and then pressing the lid into the mass in the flange. In about 15 minutes, the retort may be heated. The mass just described furnishes a very good cement, which does not crack, resists the passage of gases for some time (about 6 hours certainly), and at the same time easily gives way, should there be a sudden high pressure developed within the retort. Even if the lid should be completely thrown or projected upwards, no damage from flying fragments can result. To loosen the lid, it is only necessary to tap the flange lightly with a hammer. If desired, the lid may be provided with an inlet, so that the retort may be periodically refilled when the current of generated gas becomes weaker.—Amer. Drugg., Oct. 1888, 197; from Zeitsch. f. Anal. Chem., 1888, 467.

A New Water Bath.—The "Pharm. Record" (Feb. 4, 1889, 34) calls attention to a new water bath which is shown in the annexed cut (Fig. 19.) It is of agate ware, and is known as the "Pearl Agate Iron Water Bath." It is made in three sizes, capacity 8, 16 and 32 ounces, and will be found an excellent adjunct to the apparatus of dispensing pharmacists.

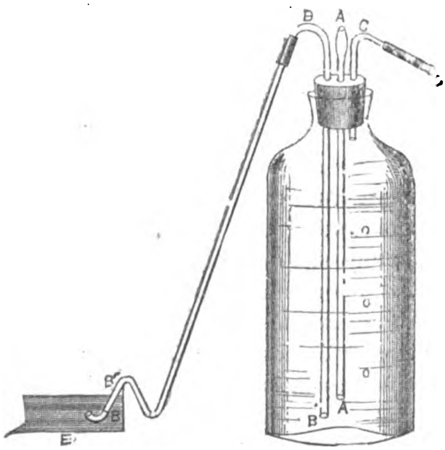
FIG. 19.



Water Bath.

Water Bath—Method of Maintaining a Constant Level.—W. H. Symons suggests that Gay-Lussac's arrangement on the principle of a "Marriotte's Bottle," for keeping the liquid in a filter at a constant level, answers equally well for a water-bath. He has used it, constructed as follows, successfully for several years. A bottle, conveniently a "Winchester quart," is fitted with a rubber stopper, through which pass three tubes, as shown by Fig. 20. *A* is a long, straight tube, open at both ends, and

FIG. 20.



Regulator for Water-Bath.

passing nearly to the bottom of the bottle; *B* is a bent tube, also open, terminating below *A*, and intended to act as a syphon. At *B* it is bent thrice upon itself to prevent the heating of the column of water by convection. The tube *C* terminates inside the stopper, and is opened or closed as necessity requires by means of the caoutchouc tube and glass rod *D*. The bottle is filled through *A* by means of a funnel, the plug *D* being removed while filling; when the plug is replaced, any further quantity of water added will run out through *B*, and when the supply of water through the funnel ceases, it will continue to flow until the level of the liquid in the water-bath *E* is in the same horizontal plane as the bot-

tom of the tube *A*. If more water be added directly to the water-bath, the water will rise in the tube *A*; it therefore answers as a gauge of the level in the communicating vessel.—Pharm. Jour. and Trans., Sept. 15, 1888, 206–207.

Ebullition—Prevention of Bumping by Means of Charcoal.—Charles Tomlinson observes that porous nuclei, such as capillary tubes, for instance, prevent bumping by force of their capillarity, and so powerful is this force alone that it can be applied in a variety of ways. Even a short bundle of fine capillary tubes, united, like a faggot, by a thread in the middle, is an active nucleus in liberating vapor. Such a bundle, weighing only 10 grains, put into a retort, from which methylated-spirit was being distilled, raised the amount of distillate in the ratio of 100 to 110. A Russian chemist has found that charcoal acts only for a short time in preventing bumping. This may be the case with ordinary wood charcoal, but it is not so with well prepared *boxwood charcoal*, or still better with *cocoanut-shell charcoal*, which will continue active for hours, and even days, making the boiling easy and increasing the amount of the distillate. For example, methylated spirit, boiling at 171° F., distilled in a glass retort, gave 244 grains in five minutes; but when three or four fragments of boxwood and cocoanut charcoal, weighing together 20 grains, were added, the distillate, in five minutes, weighed 325 grains, or as 100 to 133.2.—Chem. News, Nov. 16, 1888, 235.

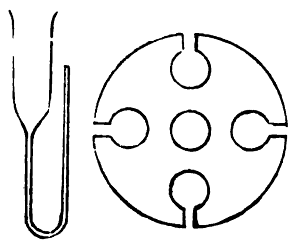
Thermo-regulator—New Form and Construction.—A. d'Arsonval describes a new thermo-regulator combined with drying oven. The thermometer forms an integral part of the apparatus, which consists of a metallic box, formed of grooved or corrugated plates, such as are used for aneroid barometers, and constitutes the central part of the lower cone of the oven. The gas is admitted to the regulator by a central inlet, and passes through two lateral branches provided with stop cocks to the two burners, each of which is surmounted by a small hood. The stop-cocks are so constructed that air can be admitted by turning them, whereby the flames become non-luminous, and serve as Bunsen burners. The heat of the flame is conveyed through a series of tubes passing through the liquid contained between the double walls of the apparatus, on the principle of a vertical tubular boiler. The space between the walls is filled with water from which the air has been driven out by boiling, which may be done in the apparatus itself. If a higher temperature than 100° C. is required, a sufficient amount of glycerin is mixed with the water. The upper cone of the apparatus is provided with a neck bearing a cork and glass tube. When the liquid in the apparatus expands by heat, it rises in the tube, and the additional pressure causes the regulator at the bottom to collapse in proportion to the pressure, thus diminishing the amount of gas conducted to the burners. Another neck is fitted with a thermometer passing into the interior of the apparatus. The

inventor claims that the regulation of temperature may easily be adjusted for any desired degree. The interior is accessible through a door at the side, and is divided into several compartments. To prevent evaporation of water from the upright glass tube, the author recommends to introduce into it a drop of kerosene. The author uses the apparatus also for obtaining temperatures below that of the surrounding air. For this purpose, he causes water from the water service (provided this has the desired temperature) to pass through the tubes between the walls.—Amer. Drugg., Oct. 1888, 193; from L'Union Pharm., 1888, 352.

Partial Vacuum—Practical Arrangement.—W. H. Symons fits a rubber stopper, bearing a glass tube bent at right angles, to an ordinary one gallon tin can. A rubber tube, provided with a pinch-cock, is slipped over the end of the glass tube, and, about one-half pint of water having been introduced into the can, it is boiled until the air has all been expelled from the can and replaced by steam. The pinch-cock is then closed, the vessel being removed from the source of heat, and the tin is cooled by placing it in cold water. The rubber tube is now attached to the vessel from which the air is to be extracted, and the cocks are opened. From a vessel of about one litre capacity about three-fourths the air is thus removed, and by repeating the process, the pressure will be reduced to about one-sixteenth of an atmosphere, sufficient for most practical purposes.—Pharm. Jour. and Trans., Sept. 15, 1888, 207.

Apparatus for Determining Melting Points.—W. H. Symons describes the following construction of an apparatus for determining the melting points of fats: A piece of thin spindle tubing is enlarged at one end and drawn out and bent round U-shaped at the other, as shown by Fig. 21. A small portion of the substance to be examined is placed in the wide end, which is afterwards loosely plugged with cotton. Several such tubes can be attached to a thermometer by means of a cork cut as shown by Fig. 22. The central hole grips the thermometer sufficiently tight to re-

FIG. 21. FIG. 22.

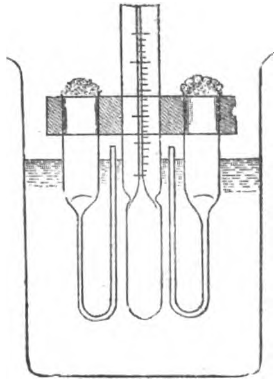


21. Glass Tube. 22. Cork Perforated for Determining Melting Points.

main at any height it may be placed. The tubes are so inserted that the capillary tubes almost touch the bulb of the thermometer. The arrange-

ment is then placed in a double water-bath, the inner vessel being a small beaker partially filled with water (see Fig. 23), the outer vessel, not shown

FIG. 23.



Apparatus for Determining Melting Points.

in the cut, being a large beaker, quite full of water. The water should have been recently boiled, to remove air. The bath is then heated until the substances melt, the source of heat is then removed, and while the bulb of the thermometer remains in the liquid the cork is shifted upward, so as to lift the tubes out of the water. The substances immediately solidify. When the temperature has fallen 5° they are reimmersed in the bath and the effect observed. The operation is repeated until the melting point is approximately obtained, when more careful observations are made at every 0.5°, or oftener. For bodies melting between 100° C. and 150° C., sulphuric acid may be used, and above this temperature fusible metal may be employed.—Pharm. Jour. and Trans., Sept. 5, 1888, 205–206.

Incineration—Method Applicable to Organic Matter.—H. Kronberg gives the following details of a method of incineration of organic matter devised by him. In order to incinerate substances which, during incineration, swell up strongly like sugar or deflagrate slightly, or give off dust like the salts of the organic nitro-acids, the author weighs off a portion of the pulverized sample in a glass tube which can be stoppered, and transfers it to the platinum crucible in such small portions that no tumefaction or dispersion of ashes can take place. The crucible contains, as a stirring-rod, a short thick straight platinum wire, which projects above the edge of the crucible only so far that it may be grasped, passes through a very small lateral opening in the edge of the lid, and is weighed along with the crucible and lid. The charge is ignited, the crucible being covered, beginning at the side, and continuing to ignite with the crucible placed in a slanting position. The ash is crushed, if necessary, with the platinum

rod, the crucible is let cool, and a further portion of the substance is added and treated as above. When a sufficient quantity of the ash has thus collected, the entire mass is ignited at a higher temperature. For the completion of the incineration, if nitric or sulphuric acid is inadmissible, the crucible is let cool down to about the boiling-point of water, and so much water is added drop by drop along the side of the crucible, that on stirring with the wire all the soluble salts are dissolved. Any carbonaceous matter remaining is brought to the sides of the crucible, the small quantity of water is cautiously evaporated away, and the whole is re-ignited.—Chem. News, Oct. 19, 1888, 197; from Zeitsch. f. Anal. Chem., xxvii, Part 4.

Incineration—Manipulation in Determination of Ash.—Prof. F. A. Flückiger recommends for ash determinations that the substance under examination be heated so slightly in a roomy platinum or porcelain crucible that it is carbonized without flame. It is convenient to cover the capsule with a net of platinum wire. When the emission of vapors has ceased, it is let cool, an abundance of water is added to the spongy carbon, and it is perfectly dried on the water-bath. When this is effected, it is again heated very gently (to prevent loss), and the temperature is raised very gradually. In general, the carbon smoulders away very rapidly; but if not, the treatment with water is repeated, and the ignition begun again.—Chem. News, Nov. 23, 1888, 256; from Zeitsch. f. Analyt. Chem. xxvii., Part 5.

Platinum Crucibles—Removal of Fused Masses.—Prof. L. L. de Koninck suggests the following method for the removal of fused masses from platinum crucibles, obtained by the disaggregation of alkaline carbonates, sulphates, etc. When the fusion is complete the author immerses vertically in the centre of the melted mass, the spiral extremity of a strong platinum wire, 0.5 mm. in thickness and 8 to 10 cm. in length, with a loop at its upper end. The wire is kept in this position until the mass solidifies. When completely cold the crucible is suspended by means of a second platinum wire, hooked to the former and attached to a glass hook supported a few millimetres above a triangle of platinum or of pipe-stems. The crucible is then rapidly heated by means of a strong lamp, and as soon as the outside layer of matter in contact with the matter enters into fusion, the crucible falls down upon the triangle and the mass which remains solid is suspended on the wire. This wire is immediately seized with the forceps with one hand and lifted away from the crucible, whilst with the other hand the lamp is removed.—Chem. News, March 8, 1889, 121; from Rev. Univ. des Mines et de la Metall., Sept. 1888.

GENERAL LABORATORY WORK.

Mortars and Graduates—Cleaning. Hans M. Wilder makes some practical remarks on the precautions to be observed in cleaning mortars and graduates, which may repay perusal.—See Amer. Jour. Phar., May, 1889, 236.

Draining Board—Improved Construction.—Adolf G. Vogeler draws attention to a cheap and efficient drain-board for the graduates and tumblers of a moderate soda-water trade. The invention consists in merely placing a strip of wood one-fourth of an inch thick along each side of the drain board proper. Inverting your tumblers on the edge of this lath allows the water to drain off without causing those fine particles of dirt to be drawn up by capillary attraction, and which give rise to that unsightly ring around the edge of the tumbler or graduate.—West. Drugg., Feb. 1889, 44.

Kneading Machine—A Useful Apparatus for Pill Masses, Plasters, Ointments, etc.—Messrs. Werner & Pfeidler, of London, manufacture a strong and compact kneading machine, which appears to be very useful for making pill masses, or mixing ointments, plasters, or other similar compounds. The machine is made in two sizes, capable of working 2 to 4 pounds of any kind of mass in from 5 to 15 minutes, under proper manipulation. It is shown by cuts illustrating the description in Amer. Drugg., Aug. 1888, 143.

Blue Litmus Paper—Preparation of a Sensitive Article.—E. Utescher states that blue litmus paper made by neutralizing an aqueous solution of litmus with phosphoric acid is liable to wrongly indicate the reaction of some solutions; the aqueous solution of litmus, in addition to the potassium salt of the coloring matter, contains the carbonates of potassium and ammonium, which with phosphoric acid, form the acid salts, K_2HPO_4 and $(NH_4)_2HPO_4$, with alkaline reactions, and certain quantities of phosphoric acid can be added to solutions of these salts without the production of an acid reaction. Such a paper brought in contact with ***neutral*** solutions of Ca, Ba, Sr and Ag invariably indicates an acid reaction, due to formation of acid phosphates of these metals, which have acid reactions, or of free phosphoric acid. To obtain a sensitive litmus paper, recourse must be taken to some other mineral acid, preferably HCl. The following method furnishes litmus paper which easily indicates alkalinity, as KOH, in 1 : 20000; acidity, as HCl, 1 : 50000; 100 gms. litmus in cubes are triturated with 40 gms. water to form a paste, which is then rinsed into a flask with 960 gms. water, agitated repeatedly during six hours, allowed to stand a few days, filtered and washed with water to make 1000 gms.; to the filtrate add 5 gms. hydrochloric acid, warm on a water-bath to expel CO_2, and in case the blue color reappears, add HCl drop by drop until a permanent red color results; evaporate to 900

gms., and divide into two portions. To one portion add lime water until the liquid becomes wine-red in color; through this solution pass strips of neutral filter paper; should the latter be acid in reaction wet with dilute ammonia water and dry; the test paper is of a wine-red color and of the above degree of sensitiveness. To the other portion add carefully, first, a few drops of solution of potash, and then lime water until a strip of paper moistened with the solution on drying just appears blue. The blue paper is not changed by silver nitrate or the neutral compounds of Ba, Sr and Ca; precipitated ferrous sulphate merely imparts a red-violet color; a solution of lead acetate does not affect the paper, but very often this chemical will show an alkaline reaction due to loss of acetic acid.—Amer. Jour. Pharm., May 1889, 245–246; from Apoth. Ztg., 1889, 279.

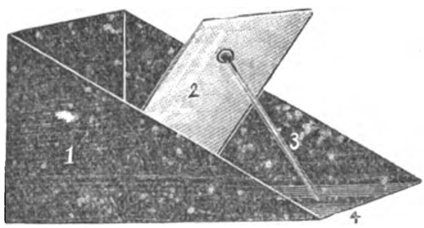
Test Papers for Urine—Convenience and Uses.—Test papers for urine as described to the *Soc. des Sci. Méd. de Gannat,* consist of small leaves of paper which, having been dipped into the proper solutions and dried, are bound into small books which may be carried in the pocket. The papers for albumin tests are made with ferrocyanide of potassium, tungstate of sodium, picric acid, potassio-mercuric iodide, and citric acid; those for sugar consist of indigo carmine, carbonate of lime, etc. Litmus papers are included. With these, a test tube, and a few "densimeters," the physician or pharmacist is able to make rapid tests. Twenty ccm. of the urine are placed in a tube and its reaction is ascertained. If alkaline, one or two citric acid papers are added and the mixture clouds with albumin, mucin, or the urates. With heat the urates re-dissolve, as also resinous substances (which are rarely present). Mucin is easily recognized by its characteristic appearance. One of the papers for albumin is then dipped into the solution and that substance is precipitated. To find sugar, 10 ccm. of pure water are placed in the tube with an indigo carmine paper, heating slightly. A soda paper and a drop of urine are added. The liquid is then heated for one minute and urine added, drop by drop, until the change takes place. The "densimeters" are the well-known specific-gravity beads, which float or sink in accordance with the density of the solution.—L'Union Méd., Oct. 9, 1888.

Iris Test Paper — Preparation, etc.—Wm. G. Greenawalt has made some experiments with the blue coloring matter of the flowers of common blue flag, with the view to utilizing it as a reagent in form of test paper. He finds that the coloring matter is not stable; that when dried it becomes brownish; but that a sensitive test paper may be made from the fresh flowers, which will last several days, and may possibly find some application in cases in which other test papers will not answer. While quite sensitive to mineral acids, it is necessary to have rather strong solutions of vegetable acids to get the red color reaction. It is greened by alkalies very readily.—Amer. Jour. Phar., Dec. 1888, 598–599.

Prescription File—New Construction.—A. J. Shaul has devised a prescription file as follows: A box or outside case about five inches wide, about seven inches deep, and of any convenient height, regulated by the number of drawers it is desired to contain. The drawer should be about two inches deep, with slanting sides, and the inside end open. The prescription to be filed is strung on the upright, a drawer with a depth of two inches being large enough to accommodate about 200 prescriptions. When wanted for reference a lead pencil or pen holder laid in the notches in the sides of the drawer will support the prescriptions which happen to be above the one wanted, and thus admit of convenient reading. The horizontal bar, being made a trifle below the level of the "file," prevents the prescriptions falling out. When the dispensing is completed, all that is necessary is to withdraw the pencil, and the prescription falls back in its place, and the drawer is returned to the case. The drawers and case are made of heavy cardboard; the case may be large enough for fifty drawers, accommodating ten thousand prescriptions. The drawers are numbered and dated on the outside, and furnished with a loop so as to be readily withdrawn. It is believed that all desirable features are represented by this "file," which though not easily made in the store, could no doubt be very cheaply manufactured in quantities.—West. Drugg., Oct., 1888, 350.

Prescription File—New Construction.—"A. G. V." describes the prescription file shown by Fig. 24. The cut represents a box drawer of

FIG. 24.



Prescription File.

proper dimensions, the sides of which are triangular. Along the full length of the bottom runs a groove (4), into which is loosely fitted a flanged rod (3), and which itself is hinged to the movable back (2). By pushing forward the rod (3), the board (2) is raised to a perpendicular line and simultaneously pressed firmly against the contained documents, while held automatically in that position by the rod (3).—West. Drugg., March, 1889, 91.

Prescription Numbering—Systematic Method.—Adolf G. Vogeler has invented a system of keeping record of prescriptions that has so far afforded unlimited satisfaction. It is briefly this: On beginning the day place into a clip a slip of clean paper dated at the top. On this slip

record consecutively the number of all repetitions for that day with cost price noted opposite the same. At the close of the day, add the sum of the repetitions to the last number on the file, and note at foot of repeat slip the next current number. For instance: Last number on ℞ file 1234; number of repetitions 6; $6 + 1234 = 1240$; hence, next number on file next morning would be 1241. This system furnishes a complete record of the ℞ business, new and repeats, without the annoyance of copying. At the end of the month, add in red ink the difference between the last number and the following hundred, and begin the new month with a new hundred, thus: last number 1240, skip 60, next number on first of month 1300. In this way one can tell exactly at any moment the number of ℞'s since the "first." In a similar manner a new year is opened with a new thousand, skipping the intervening hundreds. On a specially ruled page in the ledger enter monthly, the current number as well as the "skip," thus exhibiting the actual prescription business for corresponding months of different years.—West. Drugg., Feb. 1889, 44.

B. Preparations.

GENERAL SUBJECTS.

Standardized Pharmaceutical Preparations.—Francis Ransom read a very interesting paper on standardized pharmaceutical preparations at a meeting of the Chemists' Assistants' Association, London. He ventures the assertion that the increased reliability of drugs and pharmaceutical preparations, as secured by standardization, will tend to prevent the degeneration of the pharmacist into the mere vender of drugs. The paper will be read with interest in Pharm. Jour. and Trans., Dec. 29, 1888, 518–522.

New Remedies—Maximum Doses.—The following exhibit of the maximum doses of some of the new remedies, by Dr. B. Fischer, will be found useful:

(*To be given with the utmost caution.*)

	Single dose.	In 24 hours.
Hydrochlorate of Erythrophlœine	0.01	0.03 gram.
Carbolate of Mercury	0.03	0.1 "
Formamidate of Mercury	0.03	0.1 "
Peptonate of Mercury	0.03	0.1 "
Salicylate of Mercury	0.03	0.1 "
Hydrobromate of Hyoscine	0.001	0.003 "
Sulphate of Hyoscyamine	0.001	0.003 "
Nitroglycerin	0.001	0.005 "
Strophanthin	0.0005	0.003 "

(*To be given with caution.*)

	Single dose.	In 24 hours.
Hyperosmic Acid	0.015	0.05 gram.
Agaricin	0.015	0.05 "
Amylene Hydrate	4.0	8.0 "
Acetanilide (antifebrin)	1.0	3.0 "
Tannate of Cannabin	1.0	2.0 "
Cannabinon	0.1	0.3 "
Hydrochlorate of Cocaine	0.1	0.3 "
Guaiacol	0.1	0.5 "
Hydroquinon	0.8	1.5 "
Hypnon	0.5	1.5 "
Iodol	0.2	1.0 "
Osmate of Potassium	0.015	0.05 "
Kairine	1.0	4.0 "
Methylal	4.0	8.0 "
Resorcin	3.0	10.0 "
Sulphate of Sparteine	0.03	0.1 "
Sulphonal	4.0	8.0 "
Sulphate of Thalline	0.5	1.5 "
Tartrate of Thalline	0.5	1.5 "
Tincture of Strophanthus	1.5 (min.)	5.0 "

—Amer. Drugg., Jan., 1888, 7; from Pharm. Ztg.

ABSTRACTA.

Abstractum Rhamni Purshiana—Preparation.—Harry Lippen proposes an abstract of Rhamnus Purshiana, which, in form of pills, constitutes an agreeable form for administering the drug, the dose being from 3 to 15 grains. It is prepared as follows: Mix alcohol 15 fluidounces with water 1 fluidounce, and moisten with 2 fluidounces of the menstruum four ounces of the bark in No. 60 powder, pack in a percolator, and by maceration and displacement exhaust the powder, reserving the first 3½ fluidounces of the percolate. Distil off the alcohol from the remainder, mix the residue with the reserved portion, place the mixture in an evaporating dish, and having added one ounce of milk sugar, set aside in a warm place to dry; then add enough milk sugar to make the mixture weigh two ounces, reduce to a fine uniform powder, and keep it in a well-stopped bottle.—Amer. Jour. Phar., Dec. 1888, 608

ACETA.

Acetum Ipecacuanhæ—B. P. C. Formula.—Take of ipecacuanha root in No. 20 powder one ounce, acetic acid two fluidounces, distilled water, q. s. Macerate the powder in one ounce of the acid for twenty-four hours, and then pack in a percolator. Mix the remainder of the acid with ten ounces of distilled water, and percolate with the mixture, continuing the percolation with distilled water until one pint of the vinegar is obtained. Dose: 5 to 40 minims as an expectorant.—Year-Book of Pharm., 1888, 459.

AQUÆ.

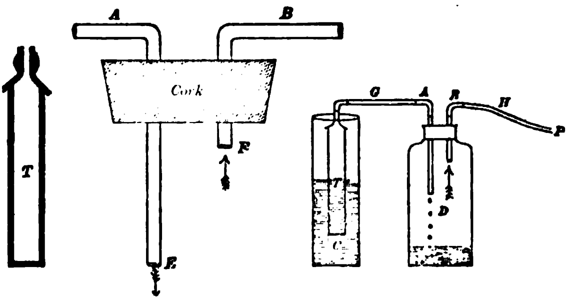
Medicated Waters—Simple Method of Preparation.—John J. Benedict recommends the following as a simple and efficient method of making the aromatic waters of the Pharmacopœia:

Take a medium-sized filter paper, fold it, and then drop the pharmacopœial amount of the oil on the paper near the point of the filter, while in a folded condition, and allow it to partly dry. Enclose this filter in a second one of the same size (or larger, if desired), and place in the funnel; then pass the water through the double filters, returning it two or three times, or until you are satisfied the water has taken up all the oil it will.

For camphor water, wet the filter thoroughly with U. S. P. spirit of camphor, and allow the alcohol to evaporate; then enclose in a second filter, and proceed as outlined for other waters.—Drug. Circ., Jan., 1889, 3.

Medicated Waters—New Method of Preparation.—Chas. T. P. Fennel has successfully overcome the difficulty usually encountered in the preparation of aromatic waters by the use of a porcelain tube such as is used in the Pasteur-Chamberlain Pressure Filter. The method of application is very simple, and requiring no expensive auxiliary apparatus. The tube consists of an unglazed porous insoluble mass, but of such close and compact nature as to prevent clogging, and still admit of a reasonably rapid flow of liquid. The tube can be readily and quickly cleansed and fit for subsequent filtrations. In order that the tube may be made serviceable, two pieces of glass tubing at right angles, and a small suction pump, are necessary. The accompanying cut (Fig. 25) will explain the apparatus

FIG. 25.



Apparatus for Medicated Waters.

and its use: T represents the porcelain tube, A and B glass tubing, F indicating exit of air, E indicating exit of filtered liquids, G and H, pieces of rubber tubing connecting with the porcelain tube T and suction pump P. To use the apparatus, the tube T is placed in the container C, containing the medicated water, rubber connections made with the bent glass tubes, fitted in a cork, well adjusted to the receiver D and the

pump P. Gradually the liquid passes through the porous cell, filling the tube T by external pressure of the atmosphere on the liquid in the container C, passing through the rubber tubing into the glass tubing B, and dripping into the receiver D at F. If the connections are well fitted, one exhaustion is sufficient, requiring no further attention, and obtaining very satisfactory results. Medicated waters prepared in this manner are clear as crystal, and thoroughly impregnated with the medicinal agent. Anise, cinnamon and fennel water are of very strong odor, and devoid of that burning taste so often the case when prepared according to the officinal process.—West. Drugg., Oct. 1888, 365: from Phar. Era.

Aromatic Waters—Preparation from Essences.—E. Dieterich prepares essences for the extemporaneous preparation of aromatic waters, which is quite customary in Europe, as follows, the aromatic water being made by adding 10 drops of the essence to a fluidounce of water:

1. *Essence for Anise Water.*

Oil of Anise	1 part.
Alcohol (90% by vol.)	9 parts.

2. *Essence for Orange Water.*

Oil of Bitter Orange	1 part.
Alcohol (90%)	20 parts.

3. *Essence for Orange Flower Water.*

Oil of Orange Flowers	1 part.
Alcohol (90%)	50 parts.

4. *Essence for Camphor Water.*

Camphor	4 parts.
Alcohol (90%)	6 parts

5. *Essence for Caraway Water.*

Oil of Caraway	1 part.
Alcohol (90%)	20 parts.

6. *Essence for Lemon Water.*

Oil of Lemon	1 part.
Alcohol (90%)	9 parts.

7. *Essence for Creosote Water.*

Creosote	3 parts.
Alcohol (90%)	7 parts.

8. *Essence for Lavender Water.*

Oil of Lavender	1 part.
Alcohol (90%)	9 parts.

9. *Essence for Rosemary Water.*

Oil of Rosemary	1 part.
Alcohol (90%)	9 parts.

Upon the same principle, the following essences might be kept on hand to prepare other aromatic waters officinal in the U. S. Ph., for instance:

10. *Essence for Cinnamon Water.*

Oil of Cinnamon	1 part.
Alcohol	6 parts.

11. *Essence for Peppermint Water.*

Oil of Peppermint	1 part.
Alcohol	9 parts.

12. *Essence for Spearmint Water.*

Oil of Spearmint	1 part.
Alcohol	9 parts.

13. *Essence for Rose Water.*

Oil of Rose	1 part.
Alcohol	50 parts.

—Amer. Drugg., Jan. 1889, 10.

Artificial Mineral Waters—Formulas.— The following formulas for certain artificial mineral waters are given by E. Dieterich. The quantities given, if expressed in grams, are sufficient in each formula to make 10 liters (10½ quarts) of artificial water.

Pullna Bitter Water.—Sodium sulphate, dry, 115.0; potassium sulphate, 6.0; sodium chloride, 25.0; sodium bicarbonate, 17.0; magnesium sulphate, dry, 190.0; calcium sulphate, precip., 6.0 parts.

Hunyadi János Water.— Potassium sulphate, 0.5; sodium chloride, 14.0; sodium bicarbonate, 52.0; sodium sulphate, dry, 180; calcium sulphate, precip., 15 0; magnesium sulphate, dry, 24.5; iron sulphate, dry, 0.2 parts.

Pyrmont Water.—Lithium carbonate, 0.1; sodium bicarbonate, 26.0; sodium sulphate, dry, 34.0, sodium chloride. 84.0; magnesium sulphate, dry, 27.0; calcium sulphate, precip., 24.0; iron sulphate, dry, 0.12 parts.

Ems Water ("*Krænchen*").—Sodium chloride, 9.0; sodium bicarbonate, 2.2; potassium sulphate, 0.4; calcium sulphate, precip., 2.8; magnesium sulphate, dry, 2.1 parts.

Friedrichshall Bitter Water.—Potassium sulphate, 1.0; sodium sulphate, dry, 40.0; sodium chloride, 115.0; sodium bicarbonate, 10.0; sodium bromide, 1.4; calcium sulphate, precip., 16.5; magnesium sulphate, dry, 133.0 parts.—Amer. Drugg., Aug. 1888, 142 and 160; from Pharm. Centralh., Nos. 21 and 22, 1888.

Soda Water.—Some practical remarks on soda water, by James Vernor, will be found of interest to pharmacists who do a soda water business. The author's paper, which will be found in "Pharm. Era" (May 1889, 179–180), is supplemented by another, equally interesting, by Dr. Charles J. Perry (Ibid, 180–181). A third paper, by W. B. and D. F. Addington, will be found in the June number of the same journal, p. 217; and a fourth by Howard S. Eckels, on page 220.

Aqua Capsici—Preparation.—Mr. Joseph W. England prepares capsicum water, which is in use at the Philadelphia Hospital, by triturating f℥ij. tincture of capsicum with ℥ss. calcium phosphate until all the alcohol is evaporated, then adding water to make, after filtration, one pint. Capsicum water is a colorless liquid, having a warm pungent taste.—Am. Jour. Pharm., Aug. 1888, 408.

Aqua Picis—Hæmostatic Value.—Dr. Saint-Mare has observed that tar water has a hæmostatic effect, particularly if prepared from pinewood tar. It has been used in pulmonary hemorrhage as well as in hemorrhage of the uterus and kidney, and may be administered in quantities of ten to fifteen drachms during a day.—Amer. Jour. Pharm., Aug. 1888, 408; from Lancet.

Aqua Chloroformi—A Vehicle for Hypodermic Solutions.—According to Dr. Unna, chloroform water is a valuable vehicle for hypodermic solutions, partly on account of its local anæsthetic effect, and because it prevents the decomposition of Fowler's solution, of ergotin, and of many other substances.—Amer. Jour. Pharm., Aug. 1888, 408; from Monatsh. f. pr. Dermat.

COLLODIUM.

Ichthyol Collodion—Formula.—Dr. Bilief uses ichthyol collodion as a local application for erysipelas. It is prepared from ichthyol, 1 gm., ether, 1 gm., collodion, 15 gm.—Amer. Jour. Pharm., Aug. 1888, 409; from Rev. Thér.

ELIXIRS.

Elixir Saccharini—B. P. C. Formula.—Take of

Saccharin	480 grains.
Bicarbonate of sodium	240 grains.
Rectified spirit	2½ fluid oz.
Distilled water	q. s.

Rub the saccharin and bicarbonate of sodium in a mortar, with half a pint of distilled water gradually added. When dissolved, add the spirit, filter, and wash the filter with sufficient distilled water to produce one pint of elixir. Each fluid drachm contains three grains of saccharin. Dose: five to twenty minims.—Year-book of Pharmacy, 1888, 460.

Elixir Phosphori—B. P. C. Formula.—Take of comp. tinct. of phosphor (which see under Tinctures) 4 fluid oz.; glycerin, 16 fluid oz. Add the tincture to the glycerin and shake well. This elixir should be preserved from the light. Each fluid drachm contains $\frac{1}{50}$ grain of phosphorus. Dose: 15 minims to one fluid drachm.—Year-Book of Pharm., 1888, 460.

Liquor Cinchonæ—Preparation.—According to Rolffs, cinchona liquor of beautiful color, pleasant bitter taste and aromatic odor is prepared as

follows: Cinchona bark, 600; fresh orange peel, 350; fresh Curaçoa peel, free from parenchyma, 150; gentian, 180; cinnamon, 100; cloves, 1; cardamom, 0.8, are macerated with white wine 2250, and alcohol (96 per cent.) 3500; rock candy, 3100, are dissolved with heat in water, 1500; and, after cooling, mixed with the vinous liquid, allowed to stand two days, and filtered.—Amer. Jour. Phar., May 1889, 247; from Phar. Ztg., 1889, 166.

Ratafia of Cacao—Modification of Guibourt's Formula.—Dr. S. Jeannel having made this preparation in accordance with Guibourt's formula, as given in L'Officine, obtained unsatisfactory results. After trying several combinations he has arrived at the following, which he recommends: Cacao (bruised and torrefied), 750 gm.; sliced vanilla, 2 gm.; alcohol of 56 per cent., 4000. Macerate for 15 days; strain; add to the residuum, boiling distilled water, 1100. Leave to cool; add to the infusion, crushed sugar, 1300. Dissolve, mix with the alcoholic liquor, and filter.—Amer. Jour. Pharm.. Feb. 1889, 80; from Bull. Com., Dec. 1888.

ENEMATA.

Enema Magnesii Sulphatis—Manipulation.—Joseph Ince, speaking of the kind of starch most suitable for making the enemata of the B. P., viz.: wheat or maize starch (see *Starch* under "Organic Chemistry") incidentally mentions that a literal construction of the formula for "Enema Magnesii Sulphatis, B. P.," would lead to unsatisfactory results. These instructions consist in directing that 1 oz. of sulphate of magnesium be dissolved in 15 fluidounces of mucilage of starch, then to add 1 oz. of olive oil, and to mix. Oil of any kind so added to a solution of a salt must separate, and the present instance forms no exception to the rule. The author suggests that one-half the water necessary to make the mucilage of starch, be used to dissolve the sulphate of magnesium; a concentrated mucilage being made with the other half of the water, the oil is incorporated with this, and the solution of salt is then added by degrees. An excellent emulsion is thus produced.—Pharm. Jour. and Trans., June 1, 1889, 969.

EXTRACTA.

Extracts—Preparation by Freezing.—The idea of concentrating watery solutions by freezing is not a new one by any means. But hitherto the process has for various reasons only been applied on a small scale. M. L. A. Adrian, in a paper read before the Paris Chemical Society, now describes a method based upon the same principle of crystallizing out the water, whereby pharmaceutical extracts can be readily prepared in large quantities with scarcely any heat being applied. The defects of the former processes—Herrera's for instance—are that (1) barely more than 60 per cent. of the water is removed by freezing; and (2) the ice sepa-

rated contains 10 to 20 per cent. of the active principles, be the pressure ever so powerful. M. Adrian proceeds differently. Instead of partly freezing the extractive solutions, as Herrera did, he submits them to a temperature of —20° C. (4° Fahr. below zero) in an ammonia ice apparatus, and thus obtains solid blocks having an average temperature of —10° C., and consequently very hard and brittle. The blocks are next passed through a peculiar shaving machine, where in less than one minute they are turned to snow, and the snow is transferred to a centrifugal extractor, which in barely twenty minutes separates out about 75 per cent. of the water and but very little of the active principles. The concentrated liquid being once more treated in the same manner, only at a still lower temperature, a syrupy liquor is obtained which is concentrated enough to rapidly afford in vacuo a solid extract, without raising the temperature above 30° C. (86° F.) Experience has demonstrated that a third freezing would be useless, if not worse, as it is wasteful, and might injure the active principles. The solid extracts obtained by the foregoing process, as compared with those prepared in vacuo or by open-air evaporation, are very light colored, afford almost clear solutions with cold water, and present in a high degree the odor and the taste of the drug, without that familiar flavor of fire. The difference is especially noticeable in respect to inspissated juices of fresh plants, as in their case the vegetable albumin is not coagulated. Another point worthy of consideration is that the cold-process extracts will probably prove more active than the old style preparations. Hence it would be well to ascertain the comparative therapeutic values of such extracts as belladonna or henbane, for instance, which are at the same time poisonous and more readily estimated. M. Adrian proposes, in a coming communication, to examine this side of the question.—Amer. Drugg., April 1889, 66; from Chem. and Drugg., March 2d.

Narcotic Extracts—New Method of Assay.—The method of L. van Itallie for the assay of narcotic extract srequires the following solutions: Lead acetate, 1 : 10; dilute sulphuric acid, 5 : 100; chloroform; ether; 1 : 100 normal acid; and as indicators cochineal tincture or an alcoholic solution of azotlinin or lacmoid. For the examination of *aconite, belladonna* and *hyoscyamus extracts*, the procedure is to take 5 gm. extract, which is rubbed up with ten drops dilute sulphuric acid and sufficient water to make 50 cc., allowed to macerate one or two hours, and 25 cc. of the lead acetate solution added. After the subsidence of the precipitate, 50 cc. are filtered off through a dry filter, 10 cc. dilute sulphuric acid added, 50 cc. filtered into a separating funnel, sufficient ammonia added to give alkaline reaction, and the alkaloid extracted by use of three portions of chloroform of 50 cc. each. The mixed chloroform extractions are distilled to dryness, the residue taken up in 5 cc. dilute alcohol and, after adding indicator, titrated with $\frac{1}{100}$ normal acid. The acid added

represents the alkaloid in $2\frac{7}{8}$ gm. extract. For *conium extract* the solution is rendered alkaline by use of potassium hydrate (1 : 2) and for extraction of alkaloid ether is used in place of chloroform; before the distillation of the ether 2 cc. water should be added. 1 cc. $\frac{1}{100}$ normal acid is the equivalent of 2 89 mg. atropine and hyoscyamine, 5.33 mg. aconitine and hyoscyamine, 5.33 mg. aconitine and 1.27 mg. conine; to obtain the per cent. of alkaloid directly from the number of cc. acid used, the following factors are calculated: atropine and hyoscyamine, 1.10404; aconitine, 0.1919; conine, 0.04572. Control experiments with atropine recovered 98.62 and 99.71 per cent.—Apoth. Ztg., 1889, 124; from Ned. Tydschr. Pharm.

Extracts of Aconite—Alkaloidal Determination in the Products of the Different Pharmacopœias.—Richard Kordes has made extracts of aconite from leaves and roots by the processes of the different Pharmacopœias, using the same lot drug in their preparation, and making determinations of the alkaloidal constituents in them with Mayer's reagent. His results are given in the following tables:

LEAVES.

AUTHORITY.	Yield of Extr. from drug.	Solid Matter in Extr.	Percentage of alkaloid calculated for			Percentage of Extracted Alkaloid.
			Normal Extract.	DryExtr.	Drug.	
Fol. Aconiti	. . . . .	. . . .	. . . .	. . . .	0.3832	100.0
Ext. Gall. (aquos.) .	45.3%	70.3 %	0.49064	0.6979	0.22220	58.0
" Ross. (aq. sp.) .	9.6	71.8	1.98080	2.7568	0.19015	49.6
" Fennic (spr.) .	18.2	76.5	2.05680	2.6880	0.37430	97.6
" Helv. (spr.) . .	20.0	76.8	1.85860	2.4000	0.37170	96.9
" Internat. (spr.)	26.0	74.9	1.45680	1.9450	0.37870	98.8
" Rossic. (sicc.) .	19.2	100.0	0.88070	0.8807	. . . .	. . . .
" Fennic. (sicc.).	54.6	100.0	0.54830	0.5483	. . . .	. . . .

ROOT.

Rad. Aconit. . . .	. . . . .	. . . .	. . . . .	. . . .	0.7901	100.0
Ext. Austr.	28.0%	62.3%	2.1694	3.4820	0.6074	76.8
" Ger.	31.6	57.6	2.1114	3.6620	0.6672	84.4
" Ross.	27.4	65.7	2.4559	3.8902	0.7003	88.6
" U. S.	17.5	. . . .	5.4570	. . . .	0.7605	96.2
" Dieterich . . .	36 0	68 3	1.8208	2.6666	0 6555	82.9
" Internat. . . .	40.0	66.2	1.8348	2.7695	0.7336	92.8
" U. S. Fluid . .	86.6	11.1	0.9066	8.1580	0.7851	99.3

—Amer. Jour. Pharm., Aug., 1888, 402: from Pharm. Zeitsch. f. Russl., 1888, 340.

Extracts of Belladonna, Hyoscyamus and Stramonium—Examination of the Products Obtained by Different Pharmacopœial Methods.—Mr. Kordes has examined extracts of stramonium, hyoscyamus and belladonna, prepared, as in the case of extract of aconite, from the same

sample of drug by the methods of the different pharmacopœias, and summarizes his results as follows:

BELLADONNA EXTRACTS—LEAVES.

Authority.	Yield of Extr. from drug.	Solid Matter in Extract.	Percentage of Alkaloid calculated for Normal Extract.	Dry Extr.	Drug.	Percentage of extracted Alkaloid.
Fol. Belladonnæ	.....	....	......	.....	0.6406	100.0
Germ. (Merck)	3.5 to 4% fresh leaves	78.1%	1.2056	1.5430	....	.....
Neerl., aq. (Merck)	.....	75.0	0.5296	0.7056	....	.....
Ross., aq. spir.	12.0	68.3	2.1673	3.1730	0.2600	40.5
Fennic., spir.	19.0	76.4	2.2252	2.9425	0.4270	66.6
Helvet., spir.	29.2	76.	1.8580	2.4430	0.5425	84.6
U. S., spir.	15.5	....	4.0500	....	0.6277	97.7
Internat., spir.	33.7	71.6	1.5678	2.1890	0.6383	99.6
Fennic., sic.	57.0	100.0	0.7374	0.7374	....	.....
Helvet., sic.	87.6	100.0	0.4142	0.4142	....	.....
Ross., sic.	24.0	100.0	1.0211	1.0211	....	.....

ROOT.

Rad. Belladonna	.....	....	......	....	0.7398	100.0
Austr., spir.	25.5	66.3	2.6828	4.0464	0.6840	92.4
Brittan., spir.	27.0	66.4	2.7212	4.0982	0.7347	99.3
Gallic., spir.	23.0	79.5	2.6920	3.3860	0.6278	84.8
Internat., spir.	29.3	68.5	2.5120	3.6060	0.7360	99.1

HYOSCYAMUS EXTRACTS—LEAVES.

Fol. Hyoscyam.	.....	....	......	....	0.14965	100.0
Germ. (Merck.)	2.5 to 3% fresh drug	76.50	0.6253	0.8043	....	.....
Neerl. (Merck.)	.....	77.05	0.5033	0.6532	....	.....
Austr., Merck.)	.....	76.65	0.7027	0.9167	....	.....
Ross.	10.7	66.65	0.7270	1.0907	0.07780	52.0
Fennic.	20.0	79.60	0.5123	0.6436	0.10250	68.0
Helvet.	18.6	76.15	0.5390	0.7078	0.09390	62.7
U. S.	15.0	73.60	0.9472	1.2860	0.14208	94.9
Internat.	20.6	75.20	0.6909	0.9187	0.14230	95.0
U. S., fluid	94.5	18.05	0.1567	0.8705	0.14808	99.0
Helv., sic.	55.8	100.00	0.1203	0.1203	....	.....
Ross., sic.	21.4	100.00	0.3338	0.3338	....	.....

SEEDS.

Sem. Hyoscyam.	.....	....	......	......	0.1335	100.0
Gallic	7%	71.85%	1.3591	1.893	0.0951	71.2

STRAMONIUM EXTRACTS—LEAVES.

Fol. Stramon	.....	....	......	....	0.2044	100.0
Neerl. (Merck.)	.....	77.00	0.8718	1.1220	....	.....
Ross.	12.0	74.35	0.7120	0.9570	0.0890	43.5
Helv.	22.3	72.55	0.6308	0.8694	0.1396	68.2
Internat.	28.4	78.00	0.7128	0.9136	0.2024	99.0

SEEDS.

Sem. Stramon.* . .	. . . . .	. . . . .	. . . . .	. . . .	0.1510	100.0
Fennic.	7.5	76.25	1.6858	2.2108	0.1264	83.7
Gallic	5.0	82.30	2.5720	3.1250	0.1265	83.7
Internat.	7.6	74.80	1.8640	2.4906	0.1416	93.8
U. S. fluid, ...	87.1	6.50	0.1679	2.5829	0.1498	99.1

—Amer. Jour. Phar., Sept. 1888, 453–454; from Phar. Zeitschr. f. Russl., 1888, 386–404–422.

Strychnos Extracts—Examination.—R. Kordes communicates the result of his examination of strychnos extracts, prepared by different processes from the same drug, the method of examination being as follows: The extracts, if fluid, evaporated under an air-pump to thick consistence in order to remove alcohol, are triturated with water, and after the complete removal of the fat by agitating with petroleum spirit, the mixture is evaporated to dryness, mixed with lime, and extracted for 1½ hours with ether in a continuous displacement apparatus. The ether is removed by evaporation, the residue dissolved in a little alcohol, 10 cc. water added, and this solution titrated with $\frac{1}{100}$ n. sulphuric acid. The extraction is repeated with a second portion of ether for one hour, the acid required in this neutralization being added to the first quantity. Every cc. H_2SO_4 used is considered the equivalent of 0.00364 alkaloid (the brucine and strychnine being assumed present in equal ratio). In the aqueous extracts, the brucine is present in three times the amount of the strychnine, due to the greater solubility of the former in water. In the following table attention has been given to points of interest in the processes for making the extracts:

* Stramonium seed yielded 26.6 per cent. oil to petroleum spirit, and hyoscyamus seed 28.0 per cent.

AUTHORITY.	Menstruum prescribed for one part of the seed.	Sp. grav. of the Alcohol menstruum.	Time allotted to maceration.*	Temperature of maceration, or of menstruum.	Consistence of Extract.	Yield of Extract from Seed.	Solid matter in Extract.	Percentage of Total Alkaloid calculated for— Normal Extract.	Dry Extract.	Material.	Percentage of Total Alkaloid extracted.	Per cent. of Strychnine in Normal Extract.	Percentage of Strychnine extracted.
Sem. Strychni†	. . . .	. . .	. . .	. . . . .	. . . . .	. . .	. . .	. . .	. . .	1.7325	100.0	. . .	0.8667
Ext. aq. Ross	7 parts water	. . .	2 days	Boiling	Dry	15.00	100.0	3.880	3.880	0.5800	33.4	0.984	0.1450
" " Helv	8 parts water	. . .	2 "	"	Dry	15.00	100.0	3.880	3.880	0.5800	33.4	0.984	0.1450
" " Dieterich	4 parts water	. . .	1½ "	15°–20°	Dry	16.00	100.0	3.112	3.112	0.4980	28.7	0.778	0.1425
" fl. U. S. P.	Until exhausted	0.846	*2 "	Warm	Fluid	89.30	. . .	0.193	. . .	1.7260	99.6	0.097	0.8630
" spir. Austria	8 parts	0.892	4 "	Digested	Thick	16.20	66.8	10.001	14.900	1.6216	93.6	5.005	0.8108
" " Britann	Until exhausted	0.884	*½ "	15°–20°	Not definite	. . .	. . .	15.000	. . .	. . .	. . .	7.500	
" " Fennic	5 parts	0.830	4 "	Digested	Thick	11.60	72.6	11.739	16.160	1.3617	78.6	5.869	0.6808
" " Gall	8 "	0.863	6 "	Macerated.	Pilular.	10.00	80.0	13.245	16.550	1.3245	76.4	6.622	0.6622
" " Germ	3½ "	0.894	2 "	To 40°	Dry	9.60	100.0	12.740	12.740	1.2230	70.6	6.370	0.6115
" " Helv	4 "	0.890	2 "	Short of dist. of Alcohol	Thick	13.50	74.5	10.510	14.169	1.4189	81.9	5.255	0.7094
" " Ross	3½ "	0.888	4 "	50°–60°	Dry	9.75	100.0	12.649	12.649	1.2330	70.6	6.324	0.6165
" " Ross proj	5 "	0.834	6 "	65°	Dry	7.00	100.0	13.741	13.741	0.9618	55.5	6.870	0.4809
" " U. S.	Until exhausted	0.846	*2 "	Warm	Pilular.	11.50	80.9	14.287	17.660	1.6430	99.7	7.143	0.8210
" " Dieterich	3½ parts	0.894	. . .	To 40°	Dry	9.50	100.0	12.831	12.831	1.2190	70.3	6.415	0.6090
" " Intern	Until exhausted	0.890	*2 "	15°–20°	Thick	16.70	70.3	10.328	14.681	1.7240	99.4	5.164	0.8620
" " sicc., Ross	Sp. Ext., with equal weight of Dextrin	. . .	. . .	. . . . .	Dry	19.50	100.0	6.324	6.324	. . .	. . .	3.162	

* Followed by percolation.

† The seed yielded to petroleum spirit 4.2 per cent. oil, solid at ordinary temperature.

—Pharm. Zeitsch. f. Russl., 1888, 537.

Extract of Nux Vomica—Standardized Preparation in Dry and Powdery Condition.—William Dunstan, speaking of the usual semi-fluid appearance of the extract of nux vomica of the Br. P., which is officinally standardized to contain 15 per cent. total alkaloid, suggests that, inasmuch as it has a tendency to become stronger by loss of moisture on keeping, and is liable to become unmanageable, it might be well to replace the moisture by some inert dry substance, such as sugar of milk. Selecting the official menstruum so that most of the alkaloid, with a minimum of oil, might be extracted, he obtained a perfectly dry preparation, to which the addition of 16.3 per cent. of sugar of milk was added, to bring it to the officinal standard (15 per cent. total alkaloid).—Pharm. Jour. and Trans., Feb. 9, 1889, 625–626.

Extracts of Conium Fruit—Alka oidal Determination.—R. Kordes has prepared extracts of conium fruit by the different pharmacopœial methods, and determined the alkaloid. The ordinary determination presents so many obstacles that for it was substituted the amount of precipitate caused by Mayer's reagent in an acidulated aqueous extract, every cc. reagent representing 0.0138 gm. In the U. S. extract correction had to be made for the glycerin which reduces the quantity of Mayer's reagent.

AUTHORITY.	Yield of Extr. from drug.	Solid matter in Extract.	Precipitated Substance calculated in per cent. for			Percentage of precipitable substance extracted.
			Normal Extract.	Dry Extr.	Material.	
Fruct. Conii	. . . . .	. . . . .	. . . .	. . . .	0.495	100.0
Extr. Gall.	10.8	81.4	2.491	3.057	0.269	54.3
" U. S.	15.2	. . . . .	3.255	. . . .	0.494	99.9
" Intern. . . .	10.4	73.3	3.970	5.416	0.421	85.2
" Fl., U. S. . .	94.8	11.6	0.538	4.655	0.494	99.9

Conium leaves contained only 0.24 per cent. of matter precipitated by Mayer's reagent.—R. Kordes, Pharm. Ztschr. f. Russl., 1888, 455.

Extract of Licorice—Examination of Commercial Samples and Process of Assay.—Wm. C. Müntzer has examined four samples of extract of licorice, that marked No. 2 in the table being of foreign manufacture, the others American. The moisture present was not determined. The water solution, treated with sulphuric acid, yielded crude glycyrrhizin, which was rendered pure by dissolving in ammonia and reprecipitating by acid. The portion insoluble in water was treated with ammonia, and this solution with sulphuric acid, when crude glycyrrhizin was obtained and purified as before.

	Cold distilled water.		Soluble portion, Glycyrrhizin.		Insoluble portion, Glycyrrhizin.		Total pure Glycyrrhizin.
	Insoluble.	Soluble.	Crude.	Pure.	Crude.	Pure.	
1	27.70	72.30	11.65	8.70	1.47	1.04	9.74
2	26.86	73.14	4.18	2.57	5.35	4.20	6.77
3	24.15	75.85	6.93	5.95	1.54	1.10	7.05
4	47.29	52.71	7.40	2.64	2.03	1.50	4.14

Solubility in water not being a reliable indication for the purity of licorice, the author suggests the following process of assay: Macerate for two hours in a flask 10 gm. of the extract, in coarse powder, with 190 gm. of distilled water and 10 gm. ammonia water; allow to settle; pour the liquid upon a filter; rinse the flask and filter with about 100 cc., used in several portions, of the same menstruum, until the washings are no longer colored brown; acidulate the filtrate with dilute sulphuric acid; allow to stand for one hour; filter; wash the precipitate with distilled water; redissolve in 5 per cent. water of ammonia; precipitate with sulphuric acid; after one hour filter; wash with distilled water until the washings produce no cloudiness with barium chloride; dry the precipitate at 100° C., and weigh. The weight multiplied by 10 gives the percentage of glycyrrhizin contained in the extract.—Amer. Jour. Pharm., Dec. 1888, 607.

Extract of Licorice—Adulteration.—The results of the examination of a number of samples of licorice, based upon a comparison of the ash yielded with that obtained from samples believed to be genuine, lead B. Dyer to the opinion that licorice is adulterated to an enormous extent. The sophisticated samples, so far as could be ascertained, appeared to be chiefly of French origin, the best samples coming from Italy. The genuine juices all contained a tolerably large quantity of starch, but this was readily distinguishable from the added starch, which was recognized in different samples as derived from wheat, barley, rice, potatoes, and perhaps rye. The samples in which adulteration was detected by the microscope showed a very low yield of ash, free from silica and clay; in four cases the quantity fell below 2 per cent., and in another case below 3 per cent., whilst that from presumably genuine specimens ranged between 3 and 5 per cent. Another difference observed was the relative proportion of potash in the ash, which in that from genuine samples amounted to from 34 to 43 per cent., whilst in that from adulterated samples it was only 18 to 30 per cent. A sample of extract of licorice made by the author by evaporating a decoction of licorice root, gave results that agree well, as regards the quantity of ash and its composition, with those obtained from the commercial samples of reputed genuineness, except that the propor-

tion of phosphoric acid in the former was much higher.—Amer. Drugg., Sept. 1888, 165; from the Analyst, July 1888, 124.

Extractum Glycyrrhizæ—Solubility not a Sufficient Test of Purity.—Kremel states that the solubility of extract of licorice is not a sufficient test of its purity, and advises determinations of the glycyrrhizin and the ash. It has been found that the ash of the unadulterated extract is always strongly alkaline. The glycyrrhizin is estimated by taking 5 gms. coarsely powdered extract and 50 cc. water, allowing to stand for several hours with frequent stirring, adding, after solution, 50 cc. of 90 per cent. alcohol which materially assists filtration, allowing to subside, and filtering through a plaited filter. The filter is well washed with 40 per cent. alcohol, and the alcohol removed from the filtrate by heating on a water-bath; after cooling, the glycyrrhizin is precipitated with sulphuric acid, collected on a small filter, washed with water and dissolved off the filter by carefully dropping on ammonia water; the filtrate is collected in a small tared beaker or capsule, evaporated on a water-bath, and finally dried at 100° and weighed.

	1	2	3	4	5
Glycyrrhizin	5.88	8.06	8.30	9.75	11.90
Ash	2.90	6.44	5.64	8.64	5.64

The ash of 1 was neutral in reaction, and the percentage of glycyrrhizin so low as to be suspicious.—Pharm. Post, 1889, 194.

Oleoresin of Male Fern—Activity of Sedimentary as well as Oily Portion.—Wm. G. Greenawalt, having become interested in the question as to the relative activity of the sediment formed in oleoresin of male fern, and of the oily portion of the same, has submitted the carefully separated portions to several physicians. These report results which prove both portions to be active tænifuges, the sediment being fully as active, if not more so, than the oily portion, over which it possesses the further advantage that it may be administered dry in capsules.—Amer Jour. Pharm., April 1889, 169–171.

EXTRACTA FLUIDA.

Fluid Extracts—Causes of Change on Keeping.—J. K. Lilly has made an extensive series of experiments, particularly with the view to ascertain the effects of direct sunlight upon them. The results are given in the table, two series of fluid extracts being taken, the one in flint, the other in amber vials, which were carefully stopped, labeled, placed in front of a west window, and allowed to remain undisturbed for eight weeks. At the end of this period they were examined as to the amount of precipitate upon the sides and bottoms, the result of which may be seen in annexed table.

It being impracticable to weigh these precipitates, the terms "none,"

"perceptible," "slight," "considerable" and "abundant" were chosen as being sufficiently exact for comparison :

Fluid Extract.	Precipitation on Side.		Precipitation on Bottom.	
	Flint.	Amber.	Flint.	Amber.
Arnica flowers	Perceptible.	Slight.	Considerable.	Considerable.
Belladonna leaves	None.	None.	None.	None.
Belladonna root	None.	None.	Slight.	Perceptible.
Berberis Aquifolium	Perceptible.	None.	Slight.	Perceptible.
Blackberry root	None.	None.	None.	None.
Black Cohosh	None.	None.	Perceptible.	Perceptible.
Blue Cohosh	None.	None.	Perceptible.	Perceptible.
Black Haw	None.	None.	Considerable.	Considerable.
Buckthorn bark	None.	None.	Slight.	Slight.
Cascara Sagrada	None.	None.	Slight.	Slight.
Cherry bark	None.	None.	Abundant.	Abundant.
Cinchona	None.	None.	Slight.	Slight.
Cotton root	Slight.	Slight.	Considerable.	Considerable.
Dandelion	None.	None.	Perceptible.	Perceptible.
Digitalis	None.	None.	Perceptible.	None.
Ginger	None.	None.	None.	None.
Golden Seal	None.	None.	Slight.	Slight.
Henbane	None.	None.	Perceptible.	Perceptible.
Licorice	Perceptible.	Perceptible.	Abundant.	Abundant.
Nux Vomica	None.	None.	None.	None.
Sarsaparilla	Slight.	Slight.	Abundant.	Abundant.
Senna	Considerable.	Considerable.	Abundant.	Abundant.

These two series were exposed to sunlight in order to determine, if possible, whether the amber glass would prevent precipitation when under same conditions with flint ware. By referring to the table it will be seen that, with the exception of one or two, the results were precisely the same in both, the difference in these exceptions being minute and very probably due to difference in thickness of glass. Does it not seem reasonable to believe, upon the basis of this comparison, that the precipitation is due to variation of temperature and not to light? It is well known that amber glass prevents changes in many delicate substances, often seen with solutions of iron salts, etc.; hence it appears in these experiments that the alternate elevation and lowering of temperature, necessarily taking place, has caused the precipitation.

To further prove or disprove this deduction, two more series were prepared in the same manner and placed in a dark portion of a large cellar upon a swinging shelf, where the variation in temperature was comparatively small; after eight weeks examination revealed very little precipitation, the amount being same in amber and flint.—Phar. Rec., Aug. 1, 1888, 233; from Ind. Pharm.

Fluid Extracts—Objection to Detannating them.—H. Tiarks discusses

the question of detannating certain fluid extracts, a method which has recently again been proposed for certain pharmaceutical purposes. Of the officinal extracts containing tannin there are only three that are employed to a sufficient extent to warrant treatment in this direction, viz.: Cinchona, wild cherry and guarana. The methods employed depend upon the removal of the tannin by the aid of albumen, gelatin, hydrate of lime, or ferric oxide, the first two being entirely too circumstantial to be practically applicable. The process of detannating being, therefore, confined to the action of lime, or of ferric oxide, it becomes important to inquire to what extent the use of these may affect the character and efficiency of the final product; and while the author has made no experiments in this direction, he expresses the opinion that, inasmuch as it is of primary importance to represent in fluid extracts and tinctures the total activity of the drug as nearly as possible, there is no justification to resort to the removal of any portion of its active constituent, as seems inevitable when the process of detannation is carried out.—Pharm. Rundschau, July 1889, 160, 161.

Fluid Extract of Pycnanthemum (Dysentery Weed)—Preparation.—Howard T. Painter prepares a fluid extract of dysentery weed (*Pycnanthemum linifolium*, Pursh—which see under "Materia Medica"), by the use of a menstruum composed of alcohol 1 part and water 3 parts. The fluid extract is of a deep red brown color, has the characteristic odor and taste of the drug, and on standing for some weeks deposits a slight precipitate. The addition of 5 per cent. of glycerin to the menstruum does not prevent the precipitate.—Amer. Jour. Pharm., Dec. 1888, 610.

Fluid Extract of Hydrastis—Composition of Deposit.—Prof. E. Schmidt observes that the yellow deposit formed in fluid extract of hydrastis is generally considered to be berberine or one of its derivatives. By recrystallization from glacial acetic acid this substance is obtained in colorless crystalline scales, melting at 133°, which on examination prove to be *phytosterin*, a vegetable cholesterin like body.

Fluid Extract of Berberis Aquifolium also contains this principle.—Pharm. Ztg., 1888, 572.

Liquid Extract of Cascara Sagrada—Tasteless Preparation.—R. Wright, in the endeavor to prepare a tasteless extract, found that when lime was used a pale colored extract was produced apparently destitute of any laxative property. But when a mixture of the bark with magnesia was extracted with dilute alcohol, the preparation obtained was free from bitterness, and appeared to act as powerfully as the bitter extract. The details of the process for its preparation are as follows: Take of cascara bark, in No. 40 powder, 1 lb.; calcined magnesia, 2 oz.; distilled water, 1½ pints; proof spirit, a sufficient quantity. Mix the powder in a large mortar, and beat to a thin paste with the water. Allow to stand for twelve hours, and dry over a water bath. Reduce the dry mass to

powder, moisten with 18 fluidounces of proof spirit, and pack tightly in a series of six percolating tubes. Percolation is then effected by means of proof spirit, passing the percolate from the first tube through the second, then from the second through the third, and so on. The first fourteen ounces that pass through the last (the sixth) tube is set aside, the percolation continued to exhaustion, the weak percolate evaporated to the consistency of a syrup, mixed with the reserve, and the measure of the whole brought to 16 fluidounces with proof spirit.—Yearbook of Pharm., 1888, 395, 396.

Fluid Extract of Staphisagria—Preparation.—J. Walton Travis, after experimenting with menstrua of different alcoholic strength, found that the fluid extracts obtained from staves-acre seeds separate fixed oil on standing. He proposes the extraction of the powdered seeds with petroleum benzin (to which they yield 24 per cent. fixed oil); the powder, thus exhausted, was used for the preparation, by the pharmacopœial method, of a fluid extract, the menstruum consisting of two parts of alcohol and one of water. The preparation was of handsome appearance, and upon standing for several months contained no precipitate.—Amer. Jour. Pharm., Dec. 1888, 609.

Extractum Tritici Liquidum.—B. P. C. Formula.—Take of

Triticum rhizome, in No. 20 powder	10 oz.
Rectified spirit } Distilled water }	of each q. s.

Moisten the powder with 4 fluid ounces of distilled water, pack in a percolator, and pour boiling distilled water upon it until it is exhausted. Evaporate the percolate to 15 fluid ounces, add to it 5 fluid ounces of rectified spirit, mix, and set aside for forty-eight hours. Then filter the liquid, and add to the filtrate enough of a mixture composed of 3 fluid parts of distilled water and one of rectified spirit to make the liquid extract measure 1 pint. Dose: 1 to 6 fluid drachms.—Yearbook of Pharm., 1888, 463.

Fluid Extract of Apocynum—Experiments with Different Menstrua.—James Webb Beckwith experimented with different menstrua and ascertained that one composed of three parts of alcohol and one of water, and containing 10 per cent. of glycerin, yielded the best results. Operating upon 200 grams of the powdered drug, the reserved portion measuring 170 cc. was perfectly clear; after evaporating the weak percolate to the consistence of a soft extract, dissolving this in sufficient of the menstruum, and adding to the reserved portion, a flocculent matter was separated, rising to the surface and leaving the liquid clear. On percolating the drug with the same mixture of alcohol and water, omitting the glycerin, the percolates were nearly clear until the evaporated portion was added to the reserved liquid, when it became turbid. A mixture of two parts

of alcohol and one of water yielded a percolate from which a precipitate separated, which was increased on the addition of the evaporated portion. The percolate of the drug obtained with diluted alcohol was cloudy and deposited a precipitate.—Amer. Jour. Pharm., March 1889, 127.

GLYCERITA.

Glycerites of Ferrous Salts—Preparation and Advantages.—Charles Arthur draws attention to several glycerites of ferrous salts, which he believes constitute more permanent preparations than the corresponding syrups. The glycerin has the property of preventing the oxidation of the ferrous compounds, and its sweet taste makes it an excellent substitute for sugar. He has prepared these glycerites for some time, and they have proved satisfactory. The first of these,

Glyceritum Ferri Iodidi, is prepared as follows: Take of iron, 1 oz.: iodine, 2 oz.; distilled water, 3 fluidounces; glycerin, a sufficiency. Mix two ounces of the water with an equal volume of glycerin in a flask, and in this mixture digest the iodine and iron, heating slightly and occasionally until the froth becomes white, then filter the liquid into 26 fluidounces of the glycerin, rinse the flask and iron wire, and wash the filter with the remaining ounce of water. Mix, and make up the measure of the product to 31 fluidounces. Its sp. g. should be about 1.300. The second glycerite proposed is

Glyceritum Ferri Bromidi.—This is prepared from 385 grains of iron and 770 grains of bromine, in the same way as the above, using the same quantity of water, and sufficient glycerin to make 31 fluidounces. The product, also, has the sp. gr. 1.300. In the same manner the glycerites of other ferrous salts may be made, the process being modified to resist the particular salt, such as the hypophosphite, phosphate, chloride or sulphate.—Pharm. Jour. and Trans., April 20, 1889, 841–842.

Glycerite of Calendula—Preparation.—Frank G. Mumma suggests the following method for preparing a glycerite of calendula: Moisten half a troy ounce of calendula, in coarse powder, with a menstruum composed of 3 measures of alcohol, one of water, and two of glycerin; then percolate to obtain 3 fluidounces of tincture; by means of a gentle heat evaporate the alcohol and water, add enough glycerin to make 3 fluidounces, heat for a few minutes, and strain through fine muslin. It is not perfectly transparent. A glycerite of the leaves is very unlike that of the flowers. —Amer. Jour. Pharm., Dec. 1888, 609.

INFUSA, ETC.

Infusions and Decoctions—Remonstrance Against their Substitution by Alcoholic Preparations.—Prof. J. U. Lloyd enters a plea for the more frequent ordination of infusions and decoctions by prescribers. The tendency of recent years is to convert drugs of every discription into fluid

extracts, and the like; and while it is admitted that such have proved in many cases very valuable, as well as convenient forms for the administration of vegetable remedial agents, in others it has resulted in discredit to what had previously been considered a very valuable medicine. It is customary to put upon the market fluid extracts of drugs that mainly depend upon mucilaginous constituents for whatever remedial value they possess; others, again, are given in large doses, and have made whatever reputation they may possess in the form of infusions or decoctions. The preparation of fluid extracts from most of them is illogical, and should be discountenanced by medical practitioners.—Amer. Drugg., June 1889, 101, 102.

Infusion of Digitalis—Improved Manipulation.—Adolph Reich suggests the following *modus operandi* for making infusion of digitalis of the Pharmacopœia: To the boiling water contained in the vessel in which it was heated add the digitalis and cinnamon in coarse powder, cover well; when cool add the alcohol, filter through a double filter, and add enough water to make a sufficient quantity. The object in adding the drug to the boiling water is that the boiling point can be maintained for a few moments yet, which would be immediately reduced by pouring the same into a cold receptacle. Secondly, by filtration we obtain a perfectly clear preparation, which does not form a precipitate, so very disagreeable to patient and doctor. It can be kept for years, but *should not* be stored, as digitalis decomposes if in stock over a year.—Pharm. Rec., June 3, 1889, 163.

LINIMENTA.

Linimentum Chloroformi, B. P.—*Improved Formula.*—Peter Boa suggests that the preparation of the chloroform liniment of the B. P. can be expedited by dissolving the camphor in the chloroform instead of in the olive oil, as required for the preparation of camphor liniment. It has also been suggested to him that the liniment is too thin. To overcome this objection he suggests its preparation as follows: Dissolve one ounce of camphor in five fluidounces of chloroform, and add sufficient soft paraffin to make 10 fluidounces. According to the consistence of the soft paraffin a thicker or thinner liniment may be obtained, as may be required.—Pharm. Jour. and Trans., Feb. 9, 1889, 625.

Soap Liniment—Satisfactory Method of Preparation.—John K. Williams draws attention to the method of J. B. Moore as being expeditious as well as satisfactory for the preparation of soap liniment: Into a quart bottle put 2 ℥ gum camphor, ½ ℥ ol. rosemary, 32 ℥ alcohol, and dissolve; into a quart tin measure put 4 ℥ of shavings or sawings of Castile soap (brown) and add all at once 6 ℥ boiling water; whip with a spatula (wood) for a few minutes, then add to the solution of camphor, etc.; shake and when cold filter quickly.—West. Drugg., Feb. 1889, 80.

Liniment for Burns—Formula.—The following formula for a liniment for burns is recommended in "Centralbl. f. Ther.": Salol, 1; olive oil, 6; lime water, 6 parts.—Amer. Jour. Pharm., Aug. 1888, 409.

Antineuralgic Liniment—Formula.—The following formula is given in "L'Union Méd.": Spirit of camphor, 90; ether, 30; tincture of opium, 6; chloroform, 20 parts. To be applied with flannel.—Amer. Jour. Pharm., Aug. 1888, 409.

Oleum Cantharidum—Preparation from Cantharidin.—F. Eger proposes the preparation of oleum cantharidum as follows: Heat over a moderate fire 0.3 gm. cantharidin with 20 gm. castor oil and 40 gm. rape oil in a small porcelain dish until solution is effected, and then dilute to 200 gm. with rape oil; the addition of the castor oil prevents the separation of the cantharidin.—Pharm. Ztg., 1889, 213.

Oleum Cinereum—Preparation in Different Strengths.—Lang proposes the preparation of oleum cinereum in two strengths, the one designated as mild, the other as strong.

Oleum Cinereum Mite is made by triturating equal parts of lanolin and mercury until the mercury is completely extinguished, then adding to six parts of the salve, so produced, four parts of olive oil.

Oleum Cinereum Fortius is prepared by shaking together 30 parts of lanolin, dissolved in 100 to 120 parts of chloroform, with 60 parts of mercury, then triturate until all the chloroform has evaporated and the mercury is completely divided. Equal parts of the salve, so produced, and of olive oil, form an oil that contains about 50 per cent. of mercury.—Arch. d. Pharm., Feb. 1889, 125, 126: from Zeitschr. d. Œster. Apoth. Ver., 26, 575.

Oleum Cinereum Benzoatum—Improved Formula.—Dr. Hasting proposes the following formula for making this preparation: 20 parts mercury are triturated with 5 parts of an ethereal benzoin solution (ether 40, benzoin 20, oil of sweet almond 5; after solution filter) until the ether has evaporated, when 40 parts fluid paraffin are added and the trituration continued.—Pharm. Post., 1888, 600.

Benzoinated Gray Oil—Preparation.—Beausse places 20 gm. of mercury in a matrass and adds 5 or 6 gm. of ethereal tincture of benzoin, with brisk agitation. When the globules are no longer visible the tincture is decanted and the vessel re-corked and again agitated. The mercury forms a soft paste on the sides of the vessel. All the material is then put in a mortar with 10 gm. of vaselin and 30 of liquid vaselin, and well triturated, adding also the washings of the matrass with ether. "This preparation requires a labor of four or five hours."—Amer. Jour. Pharm., Jan. 1889, 16, from Arch. de Ph., Nov. 5, 1888.

LIQUORES.

Medicinal Solutions—Use of Carbolic Acid for Sterilization.—According to Gaquemaire, when certain saline solutions are made in carbonic acid water with a pressure of 4 or 5 atmospheres, they will remain free, for a considerable time, from the cryptogamic vegetations which pharmacists find so undesirable. To the possible objection that the constant uncorking of the bottle in dispensing permits the gas to go off, the author says that the liquid will continue to retain one volume of the gas, and, as a matter of fact, an excess of it is always found in the last dose taken from the bottle.—Amer. Jour. Pharm., Oct. 1888, 510; from Bull. Gén. de Thérap., Aug. 15, 1888.

Mucilage of Acacia—Benzoic Acid, etc., as Preservatives.—W. P. Draper proposes, as the result of experiment with different preservative agents, the addition of ½ to 1 grain of benzoic acid to each fluidounce of mucilage of acacia. The smaller quantity will answer in the author's opinion when the mucilage has not to be kept too long. Its antiseptic effect compares favorably with carbolic or salicylic acid, and it is free from certain objectionable qualities inherent to these latter agents. Boric acid, also, is a good preservative agent, but is not as free from objection. Hydronaphthol, in proportion of 1 to 4600 mucilage preserves it quite well.—West. Drugg., July 1888, 242–243; from Proc. Mass. Pharm.. Assoc., 1888.

Liquor Ammonii Acetatis—Convenience of a Concentrated Solution.—John K. Williams observes that solution of acetate of ammonia is often dispensed in various stages of decomposition, through failure of the U. S. P. to adopt the simple method of saturating the undiluted acid with the ammonium carbonate, then adding the estimated quantity of water at the time of dispensing; 330 grains ammonium carbonate C. P. will about neutralize two fluidounces C. P. acetic acid 36 per cent. (test it), and one fluidram of this conc. liquor added to seven of water, or better yet, carbonated water, gives the U. S. P. strength of liquor ammonii acetatis. —West. Drugg., March 1889, 80.

Lime Water—Convenience of Lime Magma for its Preparation.—John K. Williams calls attention to the convenience of lime magma, prepared by slaking and washing sufficient lime for a year's supply, for making the lime water by dilution and clarification as required.—West. Drugg., March 1889, 80.

Ferric Solutions—Action of Cold.— Languepin submitted to cold a 30 to 100 solution of sulphate of protoxide of iron which had been exposed to the light while badly corked, and was much oxidized. The liquid consolidated in a greenish white mass; upon thawing it had the greenish color of protosulphate of iron. The ochre-colored deposit on the inside of the bottle had disappeared. A similar solution containing

1 to 100 of tartaric acid had also turned yellow, but became green under the influence of cold. It is curious that after undergoing this deoxidation the solutions remained unaltered for a long time. The author observed that in using them (for photographic purposes) their strength was slightly impaired.—Amer. Jour. Pharm., Sept. 1888, 449; from Bull. de la Soc. de Ph., Bordeaux, June, 1888.

Liquor Ferri Chloridi—Comparative Examination of Commercial Samples.—Albert E. Oerter prepared, experimentally, five solutions, following strictly the directions of the Pharmacopœia, varying the process in experiment II. by leaving the acid and iron in contact for 48 hours, then placing the flask in a sand bath, connecting the flask with a Liebig's condenser, and returning the acid distillate into the flask. In each of the experiments 45 grams of iron were used, consisting of card teeth in I. and II., reduced iron in III., and iron clippings, sold for preparing solutions of iron, in IV. and V. The iron left undissolved was rapidly washed and at once dried, when it weighed, respectively, 4.6, 4 5, 4.5, 4.0 and 5.0 gm. After oxidation the iron solutions were clear with the exception of III., from which a substance had to be filtered which was insoluble in water and boiling nitric acid. The specific gravity of each solution was taken and the amount of ferric oxide determined from 10 gm. Three commercial samples, VI., VII. and VIII., of solution of ferric chloride, were examined in the same manner, the results being as follows:

Samples.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Spec. grav.	1.386	1.386	1.344	1.411	1.405	1.407	1.328	1.374
Fe_2O_3 . . .	1.73	1.73	1.56	1.85	1.84	1.84	1.65	1.70 gm.

—Amer. Jour. Pharm., March 1889, 122.

Liquor Ferri Hypophosphitis Fortis—B. P. C. Formula.—Take of

Sulphate of iron	760 grains.
Hypophosphite of barium (containing not less than 95 per cent. of Ba. 2 $(PH_2O_2)H_2O$.)	830 grains.
Diluted sulphuric acid	100 minims.
Distilled water	1 pint.

Put the sulphate of iron with 5 fluidounces of distilled water in a tall 24 ounce bottle, and shake till dissolved. Dissolve the hypophosphite of barium in the remaining 15 fluidounces of distilled water, and add slowly to the former solution. Shake and add the diluted sulphuric acid; again shake and set aside for two days, then syphon off the clear liquid. Keep it in bottles quite full and in a dark place. Each fluidrachm contains about 5 grains of hypophosphite of iron. The solution has an acid reaction, and it should not give more than a faint precipitate, if any, with either diluted sulphuric acid or solution of chloride of barium. 1 Dose: 10 to 30 minims.—Yearbook of Pharm., 1888, 464.

Liquor Ferri Dialysati—Superiority over Liquor Ferri Oxychlorati.—C. Traub finds that there are decided differences in the properties of these two preparations, and disapproves of the substitution of the latter for the former. The oxychloride solution is made by dissolving ferric hydrate in hydrochloric acid; it contains 0.8 per cent. HCl, is of a decided acid taste and reaction, and is not adapted for making the albuminate solution owing to its frequent gelatinization. The dialyzed solution contains only 0.25 per cent. HCl, is of a mild taste and neutral reaction, and will form a permanent albuminate solution.—Schwz. Wchnschr. f. Pharm., 1888, 255.

Solution of Ferrous Iodide—Formula for an Unalterable Preparation.—Nicot recommends the following formula for an unalterable solution of ferrous iodide: Sugar, 40 gm.; iodine, 5 gm.; iron reduced by hydrogen, 8 gm.; distilled water, 40 gm.; pure glycerin, 110 gm. Mix the iodine and sugar in a porcelain mortar, adding the iron by degrees. Heat gently in a capsule, stirring with a glass rod, and filter to separate the excess of iron; then add the glycerin. The mixture should weigh 150 gm. The syrup is made by adding 6 gm. of this to 100 of syrup.—Amer. Jour. Pharm,, Sept. 1888, 449: from Bull. Gén. de Thérap., July 30, 1888.

Liquor Ferri Albuminati—Formula Proposed for the Germ. Pharm.—The Pharmacopœia Commission of the German Apothecaries' Society, propose the following formula for liquor ferri albuminati: 30 parts of dry albumen are dissolved in 1000 parts of lukewarm water, strained, and poured into a mixture of 120 parts of solution of ferric chloride, and 1000 parts of lukewarm water. It may be necessary to add very dilute soda solution to accurate neutralization in order to insure the precipitation of the ferric albuminate. The precipitate is washed by decantation with lukewarm water, collected on a moistened cloth, and when completely drained, transferred to a porcelain vessel, and dissolved by stirring in a mixture of 5 parts of soda solution and 50 parts of water. To this solution 250 parts of cinnamon water, 100 parts of alcohol and 50 parts of cognac are added, and then sufficient water to make 1000 parts of fluid. So prepared, solution of albuminate of iron is a clear or only slightly turbid, red-brown fluid, having barely an alkaline reaction and a faint chalybeate taste, that of cinnamon being decided, and it contains 4 parts of iron in 1000 parts. By chloride of sodium as well as by hydrochloric acid precipitates are produced; it is not rendered turbid by ammonia, nor does alcohol produce precipitation. When diluted with water (1=20) this solution is not blued by ferricyanide of potassium nor darkened by tannic acid.

Liquor Ferri Peptonati.—This is recommended by the same Commission to be prepared as follows: 10 parts of dry albumen are dissolved in 1000 parts of water, and the solution is digested 12 hours at 40° C. with

15 parts of hydrochloric acid and 0.5 parts of pepsin. The mixture is then accurately neutralized with soda solution, any precipitate produced is filtered off, and the filtrate added to a mixture of 120 parts of solution of ferric chloride and 1000 parts of water. By carefully neutralizing this mixture with very dilute soda solution the complete precipitation of the ferric peptonate is secured. This is washed and collected in the same manner as the ferric albuminate (see above), transferred to a porcelain vessel, mixed with 1.5 parts of hydrochloric acid, and heated to effect solution; 100 parts of cognac and sufficient water are then added to make 1000 parts of fluid. So prepared, solution of ferric peptonate is a clear, red-brown fluid, having a faint chalybeate taste, faint acid reaction, and containing 4 parts of iron in 1000 parts. It is not rendered turbid by heating, nor by the addition of alcohol; but the addition of a small quantity of ammonia, or of a large quantity of hydrochloric acid, produces precipitation.—Arch. de Pharm., July 1888, 645–649.

Liquor Ferri Peptonati—Preparation.—See *Ferrum Peptonatum* under "Organic Chemistry."

Liquor Saccharini—Formula.—The formula of Constantin Paul for "Saccharin Liquor" is said to have been adopted by several of the Paris pharmacists. It is as follows: Saccharin, 6 gm.; bicarb. of soda, 4 gm.; alcohol at 40°, 100 gm.; ol. menth., 20 drops; a teaspoonful represents 25 cgm. of saccharin—sufficient to sweeten a tumbler of water.—Amer. Jour. Pharm., Oct. 1888, 510.

Santonin Solution—Preparation with Castor Oil.—See *Santonin*, under "Organic Chemistry."

Blistering Liquid—Boni's Formula.—The following formula for Boni's Blistering Liquid is given in L'Union Pharm.: Pulv. Camphor, 20 parts; chloral, 30 parts; melt at 140° F., and add 10 parts pulv. cantharis; agitate for 1 hour, with heat, but do not let the temperature go above 158° F.; filter. This vesicant liquor may be used with compresses, or painted on with a brush.—Amer. Jour. Pharm., Dec. 1888, 615.

Beta-Naphthol Solutions—Formulas for Dressings.—"Le Praticien" (April 8, 1889), gives the following formula of beta-naphthol solutions suitable for dressings. 1. *Weak solution*, for parts in which membranous portions are exposed, Naphthol β, 5 gm.; alcohol at 60°, 1 litre. 2. *Ordinary solution*, Naphthol β, 15 gm.; alcohol at 60°, 1 litre. 3. *Strong solution*, for touching diseased portions of the skin, or septic excoriations, Naphthol β, 15 to 500 gm. per litre. 4. *Solution for interstitial injections, or closed septic cavities*, Naphthol β, 5 gm.; alcohol at 90°, 33 gm.; hot distilled water, to make 100 ccm.; filter and use warm. A few drops may be injected into indurated glands or abscesses. —Amer. Jour. Pharm., June 1889, 289.

Solution of Corrosive Sublimate—Objection to the Addition of Tartaric Acid.—See *Corrosive Sublimate*, under "Inorganic Chemistry."

Biniodide of Mercury Spray Solution—Preparation and Uses.—A stable spray solution of biniodide of mercury is obtained by the following formula of Miguel and Rueff: Biniodide of mercury, iodide of potassium, of each 1 gram, distilled water 100 grams. At the beginning, 10 ccm. is sprayed once daily, to be increased to 25 ccm. twice daily. The larger portion of the liquid should be inspired. It reaches the lungs, say the authors, but salivation does not follow, even after months of treatment. The sputa changes in character and diminishes in quantity; the number of microbes is lessened, but these organisms rarely disappear completely. The cough increases at first, and afterwards subsides.—Amer. Jour. Pharm., Oct. 1888, 512; from Arch. d. Pharm., Sept. 5, 1888.

Liquor Antisepticus—Formula.—The following formula for an antiseptic solution is given in Apoth. Ztg. (1888, No. 56): Menthol, 0.2; thymol, 0.5; boric acid, 2.0; sodium salicylate, 1.0; sodium benzoate 1.0; oil of gaultheria, gtt. vi; oil of eucalyptus, gtt. xviii; glycerin, 15.0; spiritus rect., 60; water, 180.0.

Embalming Liquid—Good Formula.—According to Leufen the following is a good mixture:

Arsenious Acid	20 parts.
Bichloride of Mercury	30 "
Alcohol	200 "
Carbolic Acid Water (5%)	3250 "

The quantity required in the case of adults is 5 to 6 quarts. The liquid is injected, by means of a strong syringe, into the carotid artery, or the aorta, or the main arteries of the several parts of the body, until a few fine needle-pricks into the ends of the fingers and toes show that the whole body has been charged with the liquid.—Amer. Drugg., Jan. 1889, 12: Berl. Med. Centr. Zeit., 1888, 575.

MELLITA.

Mel Depuratum—Preparation with the Aid of Alcohol.—Becker recommends 5 lbs. crude honey, 3 lbs. distilled water, and 2 lbs. alcohol, to be mixed, allowed to stand a few days, filtered, the alcohol distilled off, and the residue evaporated. The product indefinitely preserves its light color. —Pharm. Ztg., 1888, 313.

Mel Rosatum—Process for a Stable Preparation.—According to E. Schaaff: 1 part of rose leaves and 6 parts of boiling water are mixed and allowed to macerate for 24 hours in a covered vessel. To the strained liquid is added 9 parts crude honey, and this solution heated on the water bath until the precipitate coagulates, which, after cooling, is filtered off; the filtrate is evaporated to a syrupy consistence. The tannin of the rose leaves unites with the albuminous principles of the honey, and after the removal of the precipitate a honey is obtained, which remains transparent and will not ferment.—Apoth. Ztg., 1888, 680.

MISTURÆ.

Emulsions—Practical and Expeditious Method.—John K. Williams observes that the simplest, quickest, and most perfect method for emulsifying oils, etc., and one which is practically ignored in "Nat. Form.," is Wilder's method, published in 1874, viz.: To one part of powdered acacia in a dry mortar, add two parts of oil, mix, then add one and a half parts of water all at once, when, with a dozen whirls of the pestle, the union is complete, as indicated by the crackling noise and change of color; then dilute with care, ad lib. With oils like cod-liver, castor, etc., and balsams, he finds one-half the quantity of acacia, or less, will answer, but if you change the quantity of acacia, you must observe the *exact* proportion of water, as given above, that is to be added in the first instance, i. e., one-half the combined quantities of acacia and oil.—West. Drug., March 1889, 79.

Emulsions—Preparation.—Hecker recommends the use of mucilage of acacia and powdered sugar in making this class of preparations, instead of powdered acacia and water, and states that an emulsion can be made as quickly by this method as an ordinary mixture. It is immaterial in which order the substances are placed in the mortar, as by active stirring the familiar "crackling" sound of a perfect emulsion is almost immediately heard; no apprehension need be felt of such an emulsion separating into layers in less than twelve hours. For 10 gm. of the substance to be emulsified are taken: *castor oil,* 10 gm. mucilage and 5 gm. powdered sugar; *almond, poppy, olive* and *cod-liver oils,* 15 gm. mucilage and 5 to 10 gm. powdered sugar; *volatile oils,* 25 gm. mucilage and 10 gm. powdered sugar; copaiba and Peru balsam, 15 gm. mucilage and 5 gm. sugar. For *resins, gum-resins* and *ethereal extracts,* an equal weight of mucilage is desirable so as to have a consistent method of preparing emulsions.—Pharm. Post, 1889, 229.

Emulsions—Use of Cherry Gum and Glue.—Cherry gum and common glue as substitutes for gum arabic in making emulsions, have been experimented with by F. Stokowetzki, who finds that cherry-gum used in the proportion of 1 part gum to 2 parts oil makes a very thick emulsion; in the proportion 1 to 8 a watery emulsion results, and hence easily separates; the proportion 1 to 4 gives the consistence of a good emulsion; the partial solubility of the gum gives the emulsions an inelegant appearance, due to the presence of the suspended particles of bassorin; but by pouring through a fine sieve the coarse particles are removed and a more attractive preparation results. The addition of sodium bicarbonate to such an emulsion causes an immediate separation with formation of a brown color. Glue gives emulsions in the proportion 1 to 2 of excellent appearance, not to be distinguished from those made with acacia, and not affected by sodium bicarbonate. The odor of glue is masked, but

not so the taste; while it is probable that the taste of the glue by careful preparation may be remedied, it is doubtful if the substitute should be used, especially for persons having digestive troubles.—Pharm. Ztschr. f. Russl., 1889, 84.

Emulsifying Mixture—Formula.—The following is recommended by Nicot for making emulsions and for neutralizing the taste of oily and resinous drugs: Bark of quillaia saponaria, 20 gm.; balsam of tolu, 200 gm.; vanilla, 5 gm.; peel of two lemons; alcohol of 80 per cent., 1 litre. The bark is bruised with the balsam and vanilla; the peel is added in small pieces, and the whole is then macerated with alcohol for 10 days; filter. This tincture will quickly emulsionize ol. ricini, copaiba, scammony, etc. For ol. ricini, 30 gm., use 2 gm. of the emulsive mixture; mix rapidly in a mortar, and add by degrees a syrup composed of syr. simp., 40 gm.; aq. aurant. flor., 10 gm.—Amer. Jour. Pharm., Sept. 1888, 448; from Bull. Gén. de Thérap., July 30, 1888.

Emulsion of Oil of Chenopodium—A Palatable Preparation.—Harry Joseph Myers, after trying numerous agents to disguise the disagreeable taste of an emulsion of oil of chenopodium, found the following to give the most satisfactory preparation:

Celery seed	ℨii.
Purified extract of licorice	ℨi.
Powdered acacia	ℨv.
Oil of chenopodium	♏xxx.
Oil of almond (expressed)	℥ss.
Sugar	ℨiv.
Water q. s. ad	℥iv.

Mix the seed with the extract and reduce to a very fine powder; triturate with sufficient water to form a thin liquid, and strain with expression. Emulsify the mixed oils in a dry mortar, with the acacia and sugar, using a little water if the paste becomes too thick. Finally add the strained liquid and form a perfect emulsion; add water to make the liquid measure four fluidounces. The emulsion is a brown liquid, contains in a teaspoonful two drops of the oil of chenopodium, and has but a slight odor and a sweetish aromatic taste which is slightly pungent and cooling. The freshly prepared emulsion is to be preferred; but samples of it have been kept on hand for about a month, and were found to keep well, and to remain palatable. The addition of a small quantity of alcohol will render it still more permanent.—Amer. Jour. Pharm., Nov. 1888, 545–546.

Brown Mixture—Modification of Officinal Formula.—J. H. Buckingham suggests the following formula and manipulation, by which he secures an elegant preparation which is free from deposit:

Purified Extract of Glycyrrhiza	½	oz. avoir.
Sugar (loaf)	½	" "
Gum Arabic in selected pieces	½	" "
Camphorated tincture of Opium	2	fl. oz.
Wine of Antimony	1	" "
Spirit of Nitrous Ether	½	" "
Ammonia water	1	" dr.
Water	12	" oz.

The mixture of glycyrrhiza, sugar and gum arabic is tied up in a bag. Having mixed the other ingredients, with the exception of the ammonia water, place them in a wide-mouthed bottle and suspend the bag in the liquid. In two days the liquid will dissolve the solids, and then add the ammonia and make the whole measure one pint by the addition of water. —Amer. Jour. Pharm., Feb. 1889, 75–76.

Linseed Oil Mixture—Preparation—Value as an Expectorant.—Linseed oil is recommended by Prof. W. H. Thomson, as an expectorant. He thinks it more effectual than any other expectorant in rendering the bronchial secretion less albuminous and viscid, and in facilitating expectoration. It markedly diminishes bronchial irritation, and is useful in asthmatic attacks affected by changes of weather. It is useless in capillary bronchitis, and of little value in broncho-pneumonia. Where the bronchitis is primary and local in origin, it is indicated. His formula for making an emulsion, in quantity, is: Linseed oil, 15 ounces; oil of wintergreen and oil of cinnamon, of each 2 drachms; powdered gum-arabic, 10 ounces; water, 24 ounces; glycerin, 5 ounces; simple syrup, 10 ounces; dilute hydrocyanic acid, 2½ drachms. To be churned. Half an ounce constitutes a dose. To 6 ounces he might add 40 minims of Magendie's solution, and 1½ drachms of chloral.—Amer. Drugg., Feb. 1889, 36; from Med. Record.

Terpin Mixture—Formula Employed in Bronchitis.—Terpin appears to be largely prescribed in cases of bronchitis by Parisian physicians, the most popular formula being that of Chéron: Terpin, 5 gm.; glycerin, alcohol of 95 per cent., syrup of honey, of each, 70 gm.; vanillin, 0.02 gm. A tablespoonful contains 50 cgm. of terpin. Two tablespoonfuls are given daily to loosen and finally diminish expectoration. In the above doses it is not liable to cause gastric disturbance, especially if given after meals.—Amer. Jour. Pharm., Dec. 1888, 614; from Monde Phar., Oct. 5, 1888.

PILULÆ.

Pills—Uniformity in Minimum Size.—In a paper read before the British Pharm. Conference, N. Alsten brought to notice the question as to the size of pills containing very small quantities of active medicines, and suggested the desirability of adopting a uniform standard for the sake of obviating inconveniences that now result from such pills being

made of different sizes by different dispensers. In the discussion that followed, reference was chiefly made to the weight of the pill, although it is evident that the uniformity to be secured for the satisfaction of patients would apply rather to the size than to the weight. Although no definite decision was arrived at, the preponderance of opinion appeared to be in favor of a minimum size, when possible, of one grain.—Year-book of Pharmacy, 1888, 417, 425.

Excipient for Quinine Pills—Formula.—John K. Williams finds an excipient made of tragacanth, glycerin, and tartaric acid, according to the following formula, to be the most convenient and suitable: Take of powdered tragacanth, ℈ iv; glycerin, C. P., ℥ iv; rose water, f ℥ ss; powdered tartaric acid, gr. 1280. Mix tragacanth and glycerin in a suitable mortar, add the rose water at once, incorporate, then add acid in fine powder, and incorporate thoroughly. By adding 30 grs. of this excipient to 100 of the quinine salt, and working into a mass, the latter will be ready for rolling in half a minute. The author observes that while the mass is apparently too soft (it must be worked as little as possible) to roll, yet when rolled, the pill takes on an outer coating that prevents it from losing its form, and yet it will soften under the warmth and manipulation of the fingers, even though it has been made a month. This excipient is equally good for other cinchona salts and in the same proportion as given above.—West. Drugg., Feb. 1889, 80.

A New Pill Excipient.—Under the name of *cera amylata*, or pulverent wax, H. Hays recommends a new pill excipient for pills containing volatile or fixed oils, or substances difficultly miscible with water, as extract of male fern, menthol, guaiacol, creasote, etc. It is prepared by cutting with a thin sharp knife fine shavings of pure beeswax, exposing them for some days to the ordinary temperature to remove adhering moisture, weighing and mixing an equal weight of dry rice starch with one-half of the shavings in a porcelain mortar with rough surface; care must be taken that the temperature of the mixing does not exceed 16° C.; after powdering, the remaining half of the shavings are incorporated and trituration continued until a fine powder is obtained, which is at once sifted and placed in tight-fitting containers.—Pharm. Ztg., 1889, 431.

Creasote Pills—Method of Making.—F. Hachfeld observes that creasote pills are best prepared by first triturating the requisite quantity of creasote with an equal weight of powdered gum arabic, then adding water and briskly triturating so as to make a perfect emulsion. To this may then be added any convenient indifferent substances to give firmness and plasticity to the mass, so as to permit its being rolled out into pills. These are preferably coated, as patients object to the taste, which is very persistent.—Amer. Drugg., Dec. 1888, 222; from Pharm. Ztg., 1888, No. 82.

Creolin Pills—Preparation.—Spœth's formula is given by the *Semaine Méd.* as follows: Creolin, 12 gm.; dilute alcohol and tragacanth, of each, 2 gm.; ext. and powder of licorice, of each, 24 gm.; divide in 200 pills, each of which will contain 6 cgm. of creolin. They are especially recommended by M. Spœth for arresting abnormal fermentation in the intestines in all infectious maladies.—J. de Phar. et de Chimie, Oct. 1, 1888.

Pills of Iodoform—Combination Suitable in Treatment of Hemorrhage. —See *Iodoform* under "Organic Chemistry."

Agaricin Pills—A Remedy against Night Sweats.—Young finds the following combination of service as a remedy against the night sweats of consumptives, and to lessen the laxative properties of agaricin. Agaricin 0.5 gm.; Dover's powder 7.5 gm.; powdered althæa, and powdered acacia, of each 4 gm.; to be made into one hundred pills, of which two are taken daily.—Amer. Jour. Pharm., Aug. 1888, 408.

Purgative Pills—Dr. Ball's Formula.—The following is the formula for a purgative pill which appears to have become popular with Parisian prescribers. It is as follows: aloes (soc.), 1 gm.; res. scammony and jalap, of each, 50 cgm.; calomel, 50 cgm.; ext. belladonna and hyoscyamus, of each, 25 cgm.; medicinal soap, q. s. (about 2 gm.). Make 50 pills. Dose 3 to 5 daily.—Amer. Jour. Phar., April 1889, 174; from Rép. de Phar., Feb. 10, 1889.

PULVERES.

Powdered Camphor—Production of a Permanent Preparation.—A correspondent of the *Journal de Pharmacie de Lorraine* writes that for some time past he prepares powdered camphor in the following manner:

Powder the camphor in the usual manner, with the addition of a little alcohol. When it has nearly been reduced to the proper degree of fineness, add a few drops of fluid petrolatum, and immediately triturate again. In this manner a powder as fine as flour is obtained, which does not cake together. This powdered camphor may be used for all purposes, except for solution in alcohol, as it will impart to the latter a faint opalescence, owing to the insolubility of the petrolatum in the liquid.—Amer. Drugg., Feb. 1889, 36.

Compound Licorice Powder—Improved Formula.—I. H. Fisher prepares the following formula for comp. licorice powder:

Senna	2 parts.
Liquorice powder	2 parts.
Fennel	1 part.
Sulphur (sublimed)	1 part.
Cream of tartar	4 parts.
Sugar	2 parts.

He claims its more agreeable taste, ready miscibility with water, diu-

retic and refrigerant action, less griping, and more reliable as an aperient.—Pharm. Rec., April 15, 1889, 113.

Effervescent Carbonate of Iron—Formula for its Preparation.—Dr. Hermann Hager publishes the following formula, devised by him for the preparation of an effervescent carbonate of iron: Sulphate of iron, cryst. 40 p.; tartaric acid, 100 p.; bicarbonate of sodium, 166.6 p.; citric acid, 8 p.; sugar, 50 p.; oil of lemon, 1.5 p.; absolute alcohol, 1 p. Having reduced all the solids to a fine powder in a porcelain mortar, mix them with a solution of the oil of lemon in the alcohol. Then pass the mixture through a sieve, transfer it to a porcelain capsule placed on a water-bath, and stir the mass, while it is being heated, with a glass rod until it has become granular. When cool, it is at once transferred to carefully stoppered bottles. The dose is 60 to 75 grains in a tumbler filled about two-thirds full of water.—Am. Drugg., Sept. 1888, 174; from Pharm. Centralh., 1888, No. 29.

RESINÆ.

Resinoids—Examination of Commercial Specimens.—A. R. Bennet has examined a number of eclectic resinoids, which occur in commerce of very variable appearance. The samples were all obtained from ordinary shops, and comprised samples of each of the following; Podophyllin, hydrastin, euonymin, iridin, and leptandrin. As they all varied in color, the shade of which cannot be expressed very definitely in words, the author indicates the lightest colored sample in each case by the numeral 1, and the darkest by the numeral 5, the others by intermediate numerals. The same course was adopted for indicating the colors of the tinctures (= alcoholic solutions of the resinoids), these being so given in the following tables, together with percentage soluble in alcohol, (s. v. r.,) the percentage of ash, and the composition of the latter.

PODOPHYLLIN.

Sample.	Color of sample.	Color of tincture.	P. c. sol. in s. v. r.	Per cent. of ash.	Composition of ash.
A	1	1	almost entirely.	traces.	——
B	2	3	90	4	Silica and traces of iron.
C	4	5	93	6	Sulph. of soda.
D	4	4	40	30	Sulph. of alumina and silica.
E	5	5	85	14	Sulph. of alumina and potash.

HYDRASTIN.

Sample.	Color of sample.	Color of tincture.	P. c. sol. in s. v. r.	Per cent. of ash.	Composition of ash.
A	1	1	69	traces.	——
B	3	3	76	20	Sulph. of alumina and silica.
C	3	4	74	10	Sulph. of alumina.
D	3	4	80	13	Sulph. of soda and silica.
E	5	5	58	17	Sulph. of alumina and traces of potash and soda.

EUONYMIN.

Sample.	Color of sample.	Color of tincture.	P. c. sol. in s. v. r.	Per cent. of ash.	Composition of ash.
A	Dark green.	2	73	14	Carb. of lime, phosphate of lime and iron.
B	Olive brown.	1	60	14	Phos. of lime, iron, carb. of lime, and traces of silica.
C	Pale green.	3	40	34	Phos. of lime, carb. of lime, iron, and silica.
D	Olive brown.	2	60	10	Phosphate of lime, iron, and silica.
E	Pale green.	1	46	45	Carb. of lime, phos. of lime, iron, and silica.

IRIDIN.

Sample.	Color of sample.	Color of tincture.	P. c. sol. in s. v. r.	Per cent. of ash.	Composition of ash.
A	3	1.	60	traces.	——
B	2	1	56	2	Carb. of lime and iron.
C	5	2	58	3	Iron, lime and silica.
D	1	1	60	3	Carb. of lime and silica.
E	5	3	63	4	Carb. of lime, iron, and silica.

LEPTANDRIN.

Sample.	Color of sample.	Color of tincture.	P. c. sol. in s. v. r.	Per cent. of ash.	Composition of ash.
A	5	5	94	traces.	——
B	2	3	93	2	Iron, lime and traces of silica.
C	2	3	93	3	Carb. of lime and iron.
D	4	5	96	3	Carb. of lime and iron.
E	5	5	97	traces.	——

The results of these examinations show, particularly in the case of podophyllin, hydrastin and euonymin, very high ash percentages, and there is so generally a variation in color of these different resinoids, that they cannot be regarded as satisfactory. Iridin and leptandrin, on the other hand, appear to be pure products, though here also there is much variation in color.—West. Drugg., July 1888, 248–249; from Phar. Jour. and Trans.

Resinoids—Adulteration with Barium Carbonate.—Charles E. Parker, having occasion to examine some specimens of green euonymin, the presence of barium was repeatedly observed; quantitative determinations then made showed the presence of over 20 per cent. of barium carbonate. These samples being all the product of one maker, the test was extended to other concentrations from the same house, and barium was found in asclepin, apocynin, digitalin, inulin, frazerin, barosmin, and alnuin, or about two-thirds of all examined. Of the total ash (25 per cent.) in the euonymins examined, barium carbonate constituted over 80 per cent.—Drug. Circ., Feb. 1889, 30.

Green Euonymin—Adulteration with Lycopodium and Indian Hemp.—H. S. Collins subjected a sample of green euonymin of peculiar appearance to nearer examination, and found that under the microscope it revealed the presence of a large percentage of lycopodium colored green; the black particles had no definite formation. Broken, transparent, colorless crystals were also observed, which were very slowly dissolved by a drop of water placed upon the slide. A drop of solution of potash dissolved them immediately.

An analysis was made, with the following result:

	Per cent.
Lycopodium	29.8
Dark green resin, consisting chiefly of ext. Indian Hemp	15.2
Water extract: Bitter extractive matter	20.6
Sugar of milk	30.0
Water	4.4
Total	100
Ash	1.2

The following remarks regarding the analysis may be of interest: 2.5 grams were dried on water-bath for moisture, then ignited for ash; 2.5 grams were added to 20 ccm. hot water, when the characteristic odor of Indian hemp was at once recognized. It was stirred, filtered and washed until the washings were colorless, the residue dried and weighed. Loss—water previously determined and water extract.

The solution was of a very light color considering amount of matter extracted, neutral to test-paper, and of a bitter taste.

The behavior of the crystals under the microscope with potash solution, and the low percentage of ash, led me to suspect sugar of milk, which was confirmed by Fehling's solution. The quantity present was estimated by Fehling's solution standardized by sugar of milk.

The bright green residue left after extracting with water was exhausted with hot spirit until all green coloring matter was dissolved; residue dried and weighed. This residue was of a light yellow color, and under the microscope was seen to consist entirely of lycopodium.

On evaporating the spirituous extract in a water-bath a green resin was left, having the odor and all characteristics of extract of Indian hemp, and constituted 15.2 per cent.

The above analysis tends to confirm several notes that have previously been published condemning green euonymin as being most unsatisfactory and often inert. There is little doubt that the brown is much superior to the green variety now in the market.—Pharm. Rec., April 1, 1889, 97; from Chemist and Druggist.

Podophyllin—Estimation of Podophyllotoxin.—According to A. Kremel,

the active constituent of podophyllin—"podophyllotoxin" may be assayed by extracting 1 gram with cold chloroform, evaporating the greater portion of the solvent, and pouring the solution into twenty volumes of petroleum ether; the podophyllotoxin is collected upon a tared filter, dried and weighed. Commercial samples of podophyllin yield from 20 to 30 per cent. of podophyllotoxin.—Pharm. Post, 1889, 105.

SAPONES.

Dialyzed Stearin Soap—Formula.—The "dialyzed" stearin soap mentioned by E. Dieterich in his formula for "Glycerin Suppositories," (which see) is no doubt the same for which he gives a formula in his Pharm. Manuale (2), p. 310. It is as follows:

Stearic Acid	1000 parts.
Sodium Carbonate, cryst	585 "
Alcohol	100 "
Sodium Chloride	250 "
Water	3,750 "

Melt the stearic acid, and gradually add it, under stirring, to a solution of 560 parts of cystallized carbonate of sodium in 3000 parts of water, heated on a steam bath. When all the stearic acid has been added, add the alcohol, cover the vessel, and allow it to stand at least six hours on top of the steam apparatus (that is, in a warm place). Then cause the soap to separate by adding a filtered solution of the chloride of sodium, and the remainder of the carbonate of sodium (25 parts) in 750 parts of the water, transfer it to a cloth strainer, allow to become cold, and press. If it is desired to remove the salts, which are contained as impurities in all commercial stearic acid, the soap solution is not salted out, but is filled into parchment paper bags (gut or parchment "cases"), which are hung into hot water. The salts will thus gradually dialyze out. But this latter operation can be carried out with advantage only on the large scale. The yield of salted-out soap obtained from the above-named quantities amounts to at least 1100 parts.—Amer. Drugg., Dec. 1888, 226.

Disinfectant Soap—Preparation.—A disinfectant soap for surgeons' use, proposed by Reverdin, is made from oil of sweet almonds, 72; solution of potash, 12; solution of soda, 24; sulphocarbolate of zinc, 2; rose water, 10. Mix the oils with the alkalies, add the zinc salt dissolved in the rose water, and keep at 20° for several days; pour into moulds. It contains an excess of fat.—Pharm. Ztg., 1888, 660.

Petroleum Soap—Preparation.—Emery prepares a petroleum soap suitable for therapeutic uses. The formula is as follows: Petroleum, 50 parts; white beeswax, 40 parts; alcohol of 90 per cent., 50 parts; hard soap (*Savon de Marseille*), 100 parts. The petroleum, wax and alcohol are put together into a matrass and heated in a water-bath until they melt; the soap is then added. When the mixture becomes homogeneous

the matrass is removed and agitated until the contents become of a creamy consistence; it is then poured into moulds. It is not absolutely necessary to use ethylic alcohol, which serves merely to facilitate the reduction of the wax and the soap. The soap thus obtained contains about one quarter of its weight of petroleum. It is very homogeneous and firm, and emulsifies easily. Parts washed with it do not remain impregnated with petroleum, as is ordinarily the case in preparations of this kind.—Am. Jour. Phar., June 1889, 287; from Rèpert. de Phar., May 10, 1889.

SPIRITUS.

Spiritus Chloroformi—B. P. Modification.—Percy Wells suggests that the B. P. formula be modified by substituting a portion of water for alcohol, the object of the official formula being simply to secure a definite and permanent dilution of chloroform. Modified, the proportion would be: 1 ounce chloroform, 15 ounces of spir. vin. rect. (60 o. p.), and 4 ounces water.—Pharm. Jour. and Trans., Jan. 19, 1889, 567.

Spiritus Saponatus—Improved Formulas.—According to E. Utescher, the formula of Petersen, for spiritus saponatus, which has been accepted by the German Pharmacopœia Commission, does not lead to the desired result as rapidly and conveniently as the following, in which a 33 to 34 per cent. solution of potassa (*s. g.* 1.34) is used instead of the officinal 15 per cent. solution. 30 parts of the stronger solution are mixed in a flask with 30 parts of alcohol of 96 per cent., and 60 parts of olive oil; the mixture is well shaken (or the flask rolled upon a table) for 5 to 10 minutes, during which period, under evolution of heat, a clear liquid results. On then adding 250 parts of 96 per cent. alcohol and 230 parts of water, the soap spirit is completed.

E. Dieterich states that a perfectly satisfactory and unexceptionable spirit of soap may be obtained by using the officinal (15 per cent.) solution of potassa, though the process is somewhat slower than the above. 60 parts of olive oil, 70 parts of solution of potassa (Pharm. Ger., II.) and 100 parts of alcohol are shaken together occasionally in a bottle, during 2 or 3 days, until a clear solution results; 200 parts of alcohol and 170 parts of water are then added, the mixture is allowed to stand in a cool place several days, and it is then filtered.—Arch. d. Pharm., Jan. 1889, 33; from Pharm. Centralh., 29, 571.

Bay Rum—Formulas.—Messrs. Schimmel & Co. communicate the following two formulas for the preparation of bay rum from bay oil:

I.

Bay oil	2 drachms.
Pimento oil	1 drachm.
Cloves oil	10 drops.
Alcohol (95 per cent.)	½ gallon.
Water	½ gallon.

Mix and allow to stand for several days, then filter.

II.

Bay oil . . . . 1 ounce.
Alcohol (95 per cent.) . . . . ½ gallon.

Mix and allow to stand for a fortnight. Then add one gallon of good Jamaica rum. The bay rum made according to this recipe is said to correspond with the imported article.—Pharm. Jour. and Trans., April 6, 1889, 803; from "Bericht," April 1889.

SUPPOSITORIA, ETC.

Soap Suppositories, B. P.—Kind of Starch most Suitable to Use in Making Them.—Joseph Ince, speaking of the kinds of starch most suitable for making certain preparations of the B. P. (see *Starch*, under "Organic Chemistry"), states that the kind most suitable for making the soap suppositories of the B. P. is rice starch, this being of a firm granular texture, and specially advantageous to give them the required consistence.—Pharm. Jour. and Trans., June 1, 1889, 969.

Glycerin Suppositories—A Convenient Substitute for Glycerin Injections.—Glycerin injections have been found to be of good service in habitual constipation. A more convenient method of administering the glycerin, according to Boas, is by means of suppository capsules each containing 1 cc. of glycerin.—Amer. Jour. Pharm., August 1888, 409; from D. Med. Woch.. June 7, 1888.

Glycerin Suppositories—Formula.—Eugene Dieterich prepares glycerin suppositories, containing 90 per cent. of glycerin, as follows: Dissolve 10 parts of extra-hard "dialyzed" stearin soap (see under *Sapones*) in boiling water, add to the solution 90 parts of pure glycerin, filter the whole in a steam-funnel, and evaporate to 100 parts. Then pour the mass into suppository moulds. The suppositories thus prepared are firm and transparent, hygroscopic, and when exposed to the air soon become coated with water blisters. The combination of soap and glycerin appears to be a very judicious one, as soap alone is well known to act as a laxative. Mr. Dieterich makes two sizes of suppositories, weighing respectively about 10 aud 40 grains, which are wrapped in tin-foil for protection.—Amer. Drugg., Dec. 1888, 226; from Zeitsch. de. Oester. Apoth. Ver., No. 26.

Suppositories with Lanolin—Advantages.—According to L. Brontin, lanolin greatly facilitates the introduction into suppositories of extracts or other substances soluble in water. He thinks that when the choice of an excipient is left to the pharmacist, he may properly replace a small quantity of the cacao butter with lanolin. The following formula is cited as having given excellent results: Dry extract of hamamelis, 1.75 gm.; lanolin, 9 gm.; cacao butter, 90 gm.; for 25 suppositories. The extract is heated with a sufficient quantity of water, to which the melted butter is added by degrees. The mass should be run off as soon as it

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commences to thicken. The suppositories are entirely homogeneous.—Amer. Jour. Pharm., Feb. 1889, 80; from Bull. Com., Nov. 1888.

Lanolin Suppositories—Preparation.—A. Ball states that *anhydrous lanolin,* stiffened with cacao butter or stearin, will make a perfect suppository. First dissolve the medicament; work up with the lanolin and add to the melted cacao butter or stearin, and pour into moulds. The suppository is readily melted at body heat; being elastic it is not easily broken, and it is more readily retained in the rectum and quickly absorbed by the membrane.—Pharm. Jour. and Trans., May 25, 1889, 949.

Medicated Pencils—Various Formulas.—H. Hebling gives the formulas and methods for preparing medicated pencils with different bases, viz.: gelatin, glycerin and water, cacao butter, and a mixture of dextrin, sugar, starch and tragacanth. The

Gelatin Mass is best prepared from 10 oz. best gelatin, 16 oz. best glycerin, and sufficient water. The gelatin is dissolved in water and glycerin by the aid of a water-bath in a porcelain dish, the water lost by evaporation being compensated for by the addition of more. The ingredients, if not soluble in water, are mixed in a finely powdered condition with the warm and tenacious glue, and the pencils are moulded in moulds similar to those used for making caustic, previously moistened with oil or soap liniment. When cold they are quite elastic, but not sticky. The pencils made with

Cacao Butter as Base, may be made in the usual well-known manner, either by moulding or by incorporating the ingredients in a mortar and rolling out into cylinders of suitable thickness. Mr. Hebling makes use of an apparatus for pressing out pencils of suitable thickness, which may be briefly described as follows: The mass, properly prepared, is placed into a cylinder provided with a plunger operated by a screw-press. At the bottom the cylinder is provided with several holes of different diameters—$\frac{2}{16}$, $\frac{3}{16}$ inch, etc.—those not desired being closed by plugs fitting accurately in them. Cylinders of the desired thickness are forced out by the pressure of the plunger when screwed down, and may be cut into suitable lengths, say 3 inches. The author gives the following formulas:

Iodoform Pencils, 33 per cent.—Iodoform, 1 p.; cacao butter, 2 p.

Cocaine Pencils—2 per cent.—Muriate of cocaine, 1 p.; cacao butter, 49 p. To be cut in pieces containing $\frac{1}{8}$ grain of the cocaine salt each.

Salol Pencils—20 per cent.—Dissolve 1 part of salol in 4 parts of the liquefied cacao butter, stir constantly until cool, powder the mass, and form cylinders by the aid of the press.

Opium Pencils—5 per cent.—Powdered opium, 1 p.; cacao butter, 19 parts. Divide into sticks containing 1 grain opium each.

Thallin Pencils—5 per cent.—Sulphate of thallin, 1 p.; cacao butter, 19 parts. Used for gonorrhœa.

Mercurial Pencils—25 per cent.—Made with equal parts of mercurial ointment and white wax, previously melted. When cool the pencils are pressed out as described. By the aid of the press also the following elastic pencils may be made with the mass containing tragacanth, starch, etc.:

Iodoform Pencils—33 per. cent.—Iodoform, ʒ j; starch, ʒ iij; tragacanth, ʒ j; dextrin, ʒ j; sugar, ℥ ss; water and glycerin, each sufficient.

Salicylic Acid Pencils, 5 per cent.—Salicylic acid, ʒj; tragacanth, ʒj; starch, ʒj; dextrin, ʒvij; sugar, ʒiij; water and glycerin, each sufficient. These pencils may be polished, if desirable, by rolling them on a porcelain slab with a thin board. The apparatus for pressing the pencils is shown by a cut in Amer. Drugg., Aug. 1888, 147; from Brit. and Col. Drug.

Urethral Pencils—Formula.—Urethral pencils, retaining their shape for some hours, are recommended in "Monatsh. f. pr. Derm." to be prepared from cacao butter, 6; beeswax, 5; boric acid (or iodoform, etc.), 2; zinc oxide, 1; and tragacanth, 4 parts. These pencils possess a certain degree of elasticity, and are best prepared of a conical form.—Amer. Jour. Pharm., Aug. 1888, 409.

Caustic Pencils—Formula.—Dr. De Sinéty gives the following formula for caustic pencils: Crystallized phenol, 0.05; tannin, 4.0; glycerin, 5 drops; tragacanth sufficient.—Amer. Jour. Pharm., Nov. 1888, 583; from L' Union Med.

SYRUPI.

Syrups—Improved Methods and Suggestions.—John K. Williams offers some improvements and suggestions concerning the preparation of different officinal syrups. In making

Syrups by Percolation, he experienced some difficulty in fitting a plug of sponge into the orifice of the percolator, for it would either get wedged in so tight as to stop the flow, or if fitted too loose, it would suddenly go through and finish that portion at once. The device he now uses with success, is to cut a sponge to form a thin diaphragm at the base of the percolator, with a thicker piece, nipple-like, that is more or less *suspended* over the orifice so that it shall neither get wedged nor go through. He prefers the old fashioned *crushed* sugar, pounded moderately fine, to the granulated, for all syrups. As soon as the sugar is all moistened by the percolate, and ready to drop, close the outlet for twelve hours, then open it, and with a notched cork regulate the flow to suit, always turning back the first eighth that passes.

Syrupus Aurantii he prefers to make from the entire fruit, as follows:

With a piece of common tin punched for a grater, grate into a mortar the outer rind of six full flavored oranges (Jamaica or Florida preferred) which, together with ½ oz. of the oil of sweet orange, triturate with 1 oz. magnesium carbonate and 16 ozs. sugar. Express the juice from the oranges, which, together with 8 ozs. of alcohol and 32 ozs. of water, add to the contents of the mortar. Macerate a few hours; filter, adding water *ad* 55 ozs. and percolate through sugar 68 ozs. *ad* 133 ozs.

Syrup of Wild Cherry he makes by a process corresponding to the Pharm. of 1880, except that he moistens the No. 40 *young* bark with slightly warmed water; pack it and cover to an equal depth of the drug with cold water and macerate in the percolator three days; then percolate *very* slowly. *Add the glycerin to the percolate,* then percolate through sugar.

Syrup of Ipecac he prefers to make by the process originally suggested by Rother (1883). Ipecac root, in very coarse powder, 8 oz, is macerated for four days with a menstruum composed as follows: Alcohol, 4 ozs.; water, 28 ozs.; aqua ammonia, ½ oz.; express with pressure, and to the dregs add again alcohol, 4 ozs.; water, 28 ozs., and macerate four days; express with pressure, passing through the dregs enough fresh menstruum (1 to 7) to make of the combined liquors 60 ounces. Shake this with 1 oz. precip. carb. calcium and filter through paper. To the 60 ozs. of ipecac percolate, add 3 ozs. glycerin and percolate through 97 ozs. sugar *ad* 160 ozs.; cost, twenty-five to thirty cents per pound.—West. Drugg., Feb. 1889, 80–81; from Proc. Con. Phar. Assoc.

Fruit Syrups—Preparation.—M. Manch states that the pure juice of fruits contains carbonic acid; the sugar is usually added while the juice is cold, and when heat is added, the gas, being unable to escape from the thick liquid, tends to raise a portion of the mass from the bottom of the vessel. The mixture thus becomes overheated and causes the formation of caramel. He recommends that the carbonic acid be driven off the juice, by heat, before the sugar is added, and the loss made up with distilled water.—Amer. Jour. Phar., Sept. 1888, 448; from Jour. de Phar. et de Chim., July 15, 1888.

Fruit Jellies—Examination of Commercial Samples.—Lysander Mann Jones has examined six different fruit jellies purchased in the market, namely: Apple, currant, cranberry, grape, pineapple and raspberry, and compared them with a genuine currant jelly. He found the grape to be the only genuine, and made from the fruit represented. The commercial ones differ considerably in color and taste from the genuine; the genuine being of a deep red color and having a very pleasant, sweet, fruity and acidulous taste, while the commercial present a much nicer appearance, being of a bright red color and more transparent, but have a flat, ropy and but slightly acidulous taste and are not as soluble. The

standard jelly was composed of 26 per cent. water, 36.5 per cent. glucose, 32.5 per cent. saccharose, and 1.3 per cent. pectin. The remaining 3.7 per cent. consisted of insoluble matter, malic and tartaric acid. The pectin was gotten by adding alcohol to a given weight of jelly in a concentrated aqueous solution, collecting the precipitate on a filter, drying and weighing. The ash of 2 grams amounted to 5 milligrams or .25 per cent.

The author's observations seem to point to "apples" as the source of the jellies, which are then flavored and colored by artificial means. Gelatin was absent.—Amer. Jour. Pharm., Jan. 1889, 12, 13.

Raspberry Syrup—Distinction of the Genuine from Artificial Syrup. —According to H. W. Bellink, the genuine raspberry syrup can be distinguished from manufactured preparations by treating (1) 2 cc. of the syrup with 4 cc. dilute hydrochloric acid and a few fragments of zinc. It becomes colorless after a few hours, but genuine syrup by agitation and exposure to the air reassumes the original color, while imitations will not: (2) after decolorizing by use of sodium sulphite and adding nitric acid, if genuine, the red color reappears.—Pharm. Ztg., 1889, 99.

Syrupus Pruni Virginianæ—B. P. C. Formula.—Take of wild cherry bark, No. 20 powder, 3 ozs.; refined sugar, in coarse powder, 15 ozs.; glycerin, 1¼ fluidounce; distilled water, a sufficient quantity. Moisten the powder with distilled water, and macerate for twenty-four hours in a closed vessel, then pack it in a percolator, and gradually pour water upon it until nine fluid ounces of percolate are obtained. Dissolve the sugar in the liquid, by agitation, without heat, add the glycerin, strain, and, if necessary, pour sufficient water over the strainer to produce one pint of syrup.—Yearbook of Pharm., 1888, 470.

Syrupus Ipecacuanhæ Aceticus—B. P. C. Formula.—Take of vinegar of ipecacuanha, 1 pint; refined sugar, 2¼ pounds. Dissolve by the aid of a gentle heat. Specific gravity about 1.33. Dose: ¼ to 2 fluid drachms.—Yearbook of Pharm., 1888, 470.

Syrup of Ipecacuanha—Variation in Strength According to Different Pharmacopœias.—Buttin calls attention to the difference in the strength of syrup of ipecacuanha as prepared according to the French Pharmacopœia, on the one hand, and the German and Swiss Pharmacopœias on the other. According to the latter it is prepared from the *root* in the proportion of 1 : 100, whilst the codex directs its preparation from the *extract* in the same proportion. Ipecacuanha yielding from 16 to 17 per cent. of extract, it follows that the preparation of the French Pharmacopœia is six times as strong as that of the German or Swiss.—Arch. d. Pharm., Nov. 1888, 1043; from Jour. de Phar. et de Chim., 1888, xviii, 248.

Syrupus Rhei Aromaticus—Addition of Borax to Secure a Clear Prepa-

ration.—John H. Bear proposes the addition of a little borax, whereby a clear and apparently unobjectionable preparation is obtained. For one ounce avoirdupois of the aromatic tincture of rhubarb, 18 grains of borax are used.—Amer. Jour. Phar., March 1889, 128.

Syrupus Croci—Formula.—Saffron being frequently prescribed in form of syrup, C. I. S. Thomson has experimented, and recommends the following formula:

℞	Saffron	ʒiij.
	Boiling water	℥x.
	White sugar	1½lb.
	Rectified spirit	℥iss.

Infuse the saffron in boiling water for six hours and strain; set aside till cold, then heat to the boiling point and filter. Dissolve the sugar in the filtrate by means of gentle heat, and when cold add the rectified spirit. The product will be found to keep well, and remain bright and clear without precipitating.—Phar. Jour. and Trans., January 5, 526.

Syrup of Tar—Formulas.—F. W. Hausman states that, at best, syrup of tar can contain but little of the active constituents of the tar, since water extracts but very little of the substance. He recommends its preparation either from tar previously washed with water (! ? Rep.) or from dark "oil of tar" (? Rep.); from either of these, it may be made with or without the intervention of carbonate of magnesium; the preparation made from the "oil of tar" being the most satisfactory, particularly when made by the intervention of carbonate of magnesium. The proportions are 12 drachms of washed tar, or 4 drachms of "oil of tar"; 14 oz. granulated sugar, and 10 oz., or sufficient hot water to make 1 pint of syrup. For the tar preparation 1 drachm of carbonate of magnesia may be used; for the "oil of tar" 4 drachms are necessary, or 1 oz. of powdered pumice may be substituted.—Phar. Era, June 1889, 223.

Syrup of Pycnanthemum — Formula.— Howard T. Painter states that syrup prepared by mixing 1 p. fluid extract of pycnanthemum (which see) with 3 p. syrup, affords a pleasant form for administering the drug, commonly called dysentery weed.—Am. Jour. Phar., 1888, p. 610.

Syrupus Codeinæ—B. P. C. Formula.—Take of codeine, in powder, 20 grains; proof spirit, 1¼ fluid oz.; distilled water, 1¼ fluid oz. Dissolve and add syrup, sufficient to produce 1 pint. Dose: ½ to 2 fluid drachms.—Yearbook of Phar., 1888, 466.

Syrup of Albuminate of Iron and Soda—Preparation.—According to Leo Eliel a preparation, sold under the name of "Nitrogenized Iron," is nothing more than a syrup of albuminate of iron and soda. It may be made by dissolving 48 grains of scaled ferric albuminate in one pint of simple syrup.—Pharm. Rec., July 16, 1888, 213; from Ind. Pharm.

Syrup of Hydriodic Acid—Modification of the Formula of the National

Formulary.—Joseph W. England has used the formula given on p. 122 of the National Formulary, for syrup of hydriodic acid, for some time, with but one modification in detail, and that was the substitution of syrupy glucose for potassium hypophosphite, as the preservative. A sample of some made last August is as clear and destitute of free iodine as some made yesterday. The modified formula is as follows:

Iodide of potassium	123 grains.
Tartaric acid	112 grains.
Water	½ fluidounce.
Diluted alcohol	1 fluidounce.
Syrupy glucose	¼ fluidounce.
Syrup, enough to make	16 fluidounces.

Dissolve the iodide of potassium in one-half (½) fluidounce of water, and the tartaric acid in one half fluidounce of diluted alcohol. Mix the two solutions in a vial, cork and shake it well, and then place it in ice-water for about half an hour; again shake it thoroughly, and then pour the mixture upon a small white filter, and filter into a bottle containing 13¾ fluidounces of syrup and one-fourth fluidounce of syrupy glucose. When the liquid has run through, wash the vial and filter with one-half (½) fluidounce of diluted alcohol, added in several portions. Then add enough syrup to make sixteen (16) fluidounces.

The product is a clear, transparent, almost colorless liquid, odorless, having a pleasant acidulous taste, and evincing no free iodine, on the addition of cold gelatinized starch. It remains unchanged on exposure to air.—Amer. Jour. Pharm., Jan. 1889, 15–16.

Syrup of Hydriodic Acid—Improved Formula.—Otto Raubenheimer recommends the following formula as an improvement on the one given in the National Formulary:

Sodium Hypophosphite	gr. 2
Potassium Iodide	gr. 140
Dissolve in	
Water	fl. dr. 6
and add	
Glycerin	fl. oz. 2
Then add	
Tartaric Acid	gr. 127
Dissolved in	
Alcohol	fl. dr. 6
Set aside in a cool place for three hours, and add	
Syrup	enough to make fl. oz. 16

The advantages of this formula are given as follows:

1. It is the glycerin that preserves this syrup so well.
2. The complete precipitation of $H_2C_4H_4O_6$.
3. The use of hypophosphite, instead of hyposulphite, recommended by some authors.

The syrup keeps perfectly, even when exposed to sunlight.—Amer. Drugg., June 1889, 101.

Syrup of Iodide of Iron—Modification of the Manipulation.—In order to facilitate the chemical reaction in the process of the Pharmacopœia for syrup of iodide of iron, which is often quite slow, Leo Eliel suggests that instead of using 200 parts of water, as directed in the officinal formula, to use only 100 parts at first, to be added to 25 p. of iron and 82 p. of iodine, to shake the flask briskly and frequently, and when reaction has entirely ceased to add the other 100 parts of water: otherwise proceed as in the formula.—Pharm. Rec., July 16, 1888, 213; from Ind. Pharm.

Syrup of Ferrous Iodide—Causes and Prevention of Decomposition.—Zelinka has studied syrup of ferrous iodide relative to its decomposition. The conclusions arrived at are that if a pure distilled water, free from chlorine, ammonia, carbon dioxide and other volatile impurities, obtained by rejecting the distillate until this gives no reaction with silver nitrate, be used in the preparation of the syrup, a product will result that can be kept in larger quantities for a long time.—Pharm. Post, 1888, 794.

Syrup of Ferrous Iodide—Formula for a Permanent Preparation.—Joseph England found the following modification of the officinal formula to yield a permanent syrup of ferrous iodide, its stability being secured by the powerful reducing agency of the glucose introduced in the formula:

Iodine	875 grains,
Iron wire (card teeth)	300 grains,
Water	3 fluidounces,
Glucose (solid)	2 troyounces.

Syrup, a sufficient quantity to make one pint.

Mix the iodine, iron and water in a flask, shake occasionally until the reaction has ceased and the liquid has lost its iodine odor. Then heat to 212° F. (100° C.), filter into a capsule containing the glucose, finely cut up, dissolve at a low heat upon a water bath, and add sufficient syrup to make the desired quantity.—Amer. Jour. Pharm., Nov. 1888, 547–551.

Syrupus Ferri Bromidi—B. P. C. Formula.—Take of: Iron wire, free from oxide, ½ oz.; bromine, 553 grains; refined sugar, 14 oz.; distilled water, q. s. Dissolve the sugar in six ounces of distilled water, by the heat of a water bath. Put the iron wire with 4 ounces of distilled water into a glass flask, having a capacity of at least 1 pint, and surround it with cold water. Then add the bromine in successive quantities; shake occasionally until the froth becomes white, and the reaction is complete. Filter the solution into the warm syrup, and add, if necessary, distilled water sufficient to produce 1 pint. Each fluid drachm contains about 4½ grains of bromide of iron. Dose: ½ to 1 fluid drachm.—Yearbook of Pharmacy, 1888, 467.

Syrupus Ferri et Quininæ Hydrobromatum—B. P. C. Formula.—Take of acid hydrobromate of quinine, 160 grains; diluted hydrobromic acid, 1 fluid oz.; distilled water, 1 fluid oz. Mix the diluted hydrobromic acid with the distilled water, and in the mixture dissolve the acid hydrobromate of quinine, then add syrup of bromide of iron sufficient to produce one pint. Each fluid drachm contains one grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron. Dose, ½ to 1 fluid drachm.—Yearbook of Pharm., 1888, 468.

Syrup of Hydrobromate of Iron and Quinine, B. P. C.—Separation of Quinine.—R. A. Cripper, who has made this syrup several times, noticed that at periods, varying with the temperature, crystals appeared on the sides and bottom of the bottle. These proved on examination to be hydrobromate of quinine. The latter is evidently present in too large a quantity—if only two-thirds as much quinine is used, no separation takes place. The original quantity of quinine is retained, however, if the iron is omitted.—Phar. Jour. and Trans., Jan. 26, 1889, 586.

Syrupus Ferri, Quininæ et Strychninæ Hydrobromatum—B. P. C. Formula.—Take of strychnine, in powder, 2½ grains; acid hydrobromate of quinine, 160 grains; diluted hydrobromic acid, 1 fluid oz.; distilled water, 1 fluid oz. Mix the diluted hydrobromic acid with the distilled water, and in the mixture dissolve the strychnine and acid hydrobromate of quinine, by the aid of a gentle heat. Then add syrup of bromide of iron, sufficient to produce one pint. Each fluid drachm contains $\frac{1}{64}$ grain of strychnine, 1 grain of acid hydrobromate of quinine, and about 4 grains of bromide of iron. Dose: ½ to 1 fluid drachm.—Yearbook of Pharm., 1888, 468.

Syrupus Ferri Phosphati—Improved Formula.—R. Wright describes a process for the preparation of an improved syrup of phosphate of iron, containing a smaller proportion of acid and at the same time admitting of dilution without deposit of phosphate. For that purpose, the author recommends to dissolve 360 grains of iron wire in 6 fluidounces of syrupy phosphoric acid, sp. gr. 1.50, and 9 ounces of distilled water, filtering the solution into 72 fluidounces of simple syrup and adding water to make up 96 fluidounces.—Yearbook of Pharm., 1888, 396–397.

TINCTURÆ.

Opium Tinctures—Influence of Alcoholic Strength on the Morphine Percentage.—In a paper communicated to Ztg. d. Allgem. Œst. Apoth., Ver., Th. Schlosser reported the results of experiments made to determine the influence of the amount of alcohol present in opium tinctures on the percentage of morphine. He concludes from these experiments that the percentage of morphine rises with the decrease in the amount of alcohol present, and falls with the increase. E. Dieterich and G. Barthel

have now experimented in the same direction, and extracting opium by different methods, and with alcohol in different proportions, have arrived at the conclusion that Schlosser's observations are not confirmed by their own, and that the greater or less alcoholic strength of tinctures of opium has no appreciable influence on the morphine percentage.—Arch. d. Pharm., Aug. 1888, 699, 700: from Pharm. Centralh., 1888, 316.

Tincture of Opium—Improved Manipulation.—John K. Williams suggests the following method for making tincture of opium: Digest in a water bath with moderate heat for half an hour, the granulated opium with one-third of the water; transfer to jar, and when cold add remainder of water and the alcohol. As soon as settled, turn off onto a filter the liquid portion which has passed the filter, then follow with the dregs; onto them, as soon as the liquid has passed. pour the diluted alcohol, to make the quantity required. One filter answers for the whole operation, and avoids the unsatisfactory attempt at *percolation* of the moist mass as directed in U. S. P.—West. Drugg., Feb. 1889, 81: from Proc. Conn. Pharm. Assoc.

Tinctnra Opii—Examination of Commercial Samples.—Arthur M. Leine examined twelve samples, by evaporating the alcohol, shaking with ether, filtering, precipitating with ammonia, washing with ether, and drying. One sample, obtained from a country grocery store, yielded only 0.28 per cent. of morphine. The remaining samples yielded respectively 1.4, 1.2, 0.96, 0.80, 0.76, 0.70, 0.68, 0.65, 0.60, 0.54 and 0.46 per cent. of morphine. The weakest samples appear to have been made of half strength for the purpose of retailing.—Amer. Jour. Pharm., May 1889, 241.

Tinctura Opii Deodorata—Modification of the Officinal Process.—Wm. H. S. Bateman proposes a modification of the pharmacopœial process as follows: Percolate powdered opium, 10 parts, with stronger ether 28 parts; dry the powder; digest it for two hours at 175° F. (80° C.) with water 40 parts; repeat this operation twice; mix the expressed liquids; evaporate to 60 parts; filter; wash the filter with water to obtain 80 parts of filtrate, and add alcohol 20 parts.—Amer. Jour. Pharm., May 1889, 242.

Deodorized Tincture of Opium—Ethereal Odor in Commercial Samples.—Leo Eliel observes that of many samples of deodorized tincture of opium examined by him, but few may be really termed "deodorized." This is due to insufficient separation of the ether from the concentrated infusion. The ether, which holds the odoriferous principles in solution, should be entirely removed by separation. The use of a separating funnel, or in its absence a burette of fair capacity, is indispensable in this connection.—Pharm. Rec., July 16, 1888, 213; from Ind. Pharm.

Tinctura Nucis Vomicæ—Examination of Commercial Samples.—Of twelve samples of this tincture examined by Edmund H. Watkins, one

was whitish and opaque; two were of a distinct reddish tint, while the others varied from a light yellow to dark yellow. The percentage of extract obtained on evaporation was $\frac{3}{4}$, $1\frac{1}{2}$, 2 (three samples), $2\frac{1}{4}$ (two samples), $2\frac{1}{2}$ (two samples), $2\frac{3}{4}$, 3 and $3\frac{3}{4}$. The alcoholic strength of the menstruum was not determined, nor was it ascertained whether the extracts corresponded with that of the Pharmacopœia.— Amer. Jour. Phar., May 1889, 241.

Tinctura Catechu Composita—Precautions to Insure Percolation.—F. B. Quackenbush observed a difficulty in percolating the mixed powders of catechu and cinnamon; if much finer than No. 40, as directed by the Pharmacopœia, the powder would form a solid cake, which could not be properly exhausted with the requisite menstruum. This was, however, accomplished by passing the powder through a sieve several times while moistening it.—Amer. Jour. Phar., May 1889, 241.

Tinctura Kino—Advantage of Prolonged Maceration.—Tincture of kino was found by F. B. Quackenbush to filter very slowly if prepared according to pharmacopœial directions; but after prolonging the maceration to five days, the subsequent filtration was accomplished in less than one-fourth the time.—Amer. Jour. Phar., May, 1889, 241.

Tincture of Kino—Experiments with Different Menstrua.—Chas. H. Breidenbach has made tincture of kino with different menstrua: 1, the officinal; 2, alcohol 85, glycerin 15; 3, dilute alcohol; 4, water 75, alcohol 25; 5, absolute alcohol; and 6, 95 per cent. alcohol. The best results were obtained with menstruums 4 and 5, the tinctures with 5 being practically free from precipitates; those with four containing a distinct precipitate; and the remainder showing, after a month or two, indications of gelatinizing. Tincture of kino yields with lead acetate a dark bluish precipitate; the same reagent gives with tincture of catechu a light yellow, and with tincture of kino containing 10 per cent. of catechu, a dingy gray-green precipitate.—Am. Jour. Pharm., 1889, p. 71.

Tincture of Quillaya, Nat. Form.—Proposed Modification in Alcoholic Strength and Manipulation.—J. Rutherford Hill contributes some criticisms, mainly on the tincture of quillaya of the National Formulary, and also on the tincture of the Br. Ph. Conf. Formulary. The latter he considers too strongly alcoholic, the American tincture too weak, and proposes as a medium an alcoholic strength of 49 per cent. by weight. As regards the manipulation directed in the National Formulary, the extraction of the bark by boiling water has a tendency to decompose the saponin, as is evidenced from the reaction of a tincture so prepared with Fehling's solution, none being obtained when the tincture is prepared with cold water, or by direct percolation with dilute alcohol. As regards the degree of disintegration, he considers it unnecessary to employ the bark to be percolated in any other form than that of chips, the latter being read-

ily extracted. He advises that the chips be moistened with diluted alcohol, packed in a percolator, moistened with menstruum (1 pint for 8 ounces of bark), macerated for 12 hours, then percolated with sufficient menstruum to make the required measure.—Phar. Jour. and Trans., Feb. 9, 1889, 626–627.

Tincture of Guaiac—A Sensitive Reagent for Pus.—Vitali recommends tincture of guaiac as a sensitive reagent for pus in urine. The urine, being filtered, a little of the reagent is poured in, when a beautiful blue color is produced in presence of pus. Moderate warming favors, whilst excessive heat entirely prevents the reaction. Reducing agents and caustic alkalies also prevent it. Saliva, nasal mucus, and milk also give the reaction, although not so intense.—Amer. Jour. Pharm., Sept. 1888, 451; from (Bollet. Farm.) Rundsch., 1888, p. 531.

Tincture of Calendula—Characters of Different Preparations.—Frank G. Mumma observes that tincture of calendula, prepared with diluted alcohol, from either the leaves or the flowers, does not differ much in color or taste, but that of the flower is more aromatic. When, however, strong alcohol is used, the flowers yield a golden yellow, and the leaves a dark green tincture—the latter being also very unlike the former both in taste and odor.—Amer. Jour. Phar., Dec., 1888, 609.

Tinctura Calendulæ Florum—B. P. C. Formula.—Take of marigold flowers, dried, in No. 20 powder, 4 oz; proof spirit, a sufficient quantity. Moisten the powder with eight fluidounces of the menstruum, and macerate for twenty-four hours. Then pack in a percolator, and gradually pour proof spirit upon it until 1 pint of tincture is obtained. Dose, 5 to 20 minims.—Yearbook of Pharm., 1888, 471.

Tinctura Cantharidis—Preparation by Maceration.—Rob. A. Hatcher proposes maceration for preparing this tincture. He found that if prepared by percolation a small amount of cantharidin may remain behind in the powder, which can be extracted by the process of Mortreux, viz.: Exhausting with chloroform, treating the extract with carbon disulphide, and crystallizing the undissolved portion from chloroform.—Amer. Jour. Pharm., May 1889, 241.

Tinctura Capsici Fortior—B. P. C. Formula.—Take of: Capsicum fruit, in No. 40 powder, 10 oz.; rectified spirit, a sufficient quantity. Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours in a closed vessel. Then pack in a percolator, and gradually pour rectified spirit upon it until 1½ pints of tincture are obtained. Dose, 1 to 3 minims. Principally used externally.—Year-book of Pharm., 1888, 471.

Tincture of Mustard—Preparation, etc.—Joseph W. England, believing that mustard in the form of a tincture would possibly possess valuable stimulating properties, has prepared a tincture of black mustard, which has

been found to answer admirably both as a substitute for the corresponding preparation of ginger and capsicum; being stronger than ginger, but less active and irritating than tincture of capsicum. He uses for the preparation of tincture of mustard the ground commercial black mustard seed, which has had the larger portion of its 20–25 per cent. fixed oil removed by pressure. The formula is as follows:

Take of

Ground black mustard	8 troy ounces.
Water	2 fluidounces.
Alcohol	q. s. ad 1 qt.

Moisten the mustard with the water, added in small quantities at a time, in a porcelain evaporating dish or other non-metallic receptacle, and admix thoroughly. Cover well and leave stand for 24 hours. Remove and pack in a glass funnel or percolator; add 1 pint of alcohol and macerate for 48 hours. Then allow percolation to proceed, keep adding alcohol until the percolate measures 1 quart. The finished liquid is a clear, transparent, yellow fluid, having a strong characteristic odor and a warm pungent taste. Mixed with water it becomes slightly opalescent or milky, from the precipitation of a small quantity of fixed oil. Its dose is from ¼–½–1 teaspoonful well diluted with water.—Amer. Jour. Phar., March 1889, 124–125.

Tinctura Euonymi—B. P. C. Formula.—Take of: Euonymus bark, in No. 20 powder, 4 oz; rectified spirit, 1 pint. Moisten the powder with a suitable quantity of the menstruum, and macerate for twenty-four hours, then pack in a percolator, and gradually pour rectified spirit upon it until 1 pint of tincture is obtained.—Yearbook of Pharm., 1888, 473.

Tinctura Strophanthi—Formula proposed for the Germ. Pharm.—The Pharmacopœia Commission of the German Apothecaries' Association proposes the preparation of tincture of strophanthus from 1 part strophanthus seeds, (presumably the seeds of *Strophanthus hispidus*, D. C., and *Strophanthus Kombé*, Oliver, which are described), and 10 parts of diluted alcohol. The tincture is described as having a yellow color and a very bitter taste.—Arch. d. Pharm., July 1888, 650, 651.

It will be noted that this tincture differs from that originally proposed in England (see Proceedings 1888, 287), and adopted in this country, it being about double the strength (presuming the activity to be represented by the properties of seeds and solvent used), while the use of ether for the extraction of fixed oil is dispensed with, and strong alcohol is replaced by the diluted alcohol of the Germ. Pharm.—Rep.

Tincture of Litmus—Cause of Bleaching, etc.—It is well known that tincture of litmus gradually loses its color when it is kept in tightly closed bottles. For this reason it is usual to stopper the litmus bottle with a pellet of cotton, or with a perforated cork through which a bent glass

tube passes, or merely to invert a glass cap over the open neck of the bottle. The cause of the bleaching has recently been made the subject of an investigation by Dubois. According to him, tincture of litmus possesses a perfect fauna and flora, consisting of infusoria, zoospores, algæ, fungi, and other micrococci. The author examined three separate samples of the same tincture of litmus, each contained in a separate vessel. One of these was sterilized by mercuric chloride, another by heat, while the third was not sterilized. It was found that the sterilized samples retained their blue color completely. The other sample gradually lost its tint, and finally contained only a living, very small, globular micrococcus. The decolorization of tincture of litmus, in closed vessels, is therefore due to the presence of micro-organisms, which, when deprived of the access of air, cause a reduction of the blue coloring matter to a leuco- (or colorless) compound. If the latter is again oxidized, its blue color is restored.—Amer. Drugg., Jan. 1889, 12; from Bull. Soc. Chim. and Pharm. Post.

Tinctura Vanillæ—Advantage of Maceration.—The labor of powdering the vanilla is much lessened by the use of a small proportion of coarse sand previously sifted and washed. F. B. Quackenbush believes that maceration brings out the flavor better than percolation, and the longer the maceration proceeds, the more delicate will be the aroma of the tincture.—Amer. Jour. Pharm., May 1889, 242.

Tinctura Phosphori Composita—B. P. C. Formula.—Take of phosphorus, 12 grains; chloroform, 2½ fluidounces; place in a stoppered bottle, and apply the heat of a water-bath until dissolved. Then add the solution to ethylic alcohol, 12½ fluidounces; shake well. This tincture should be preserved from the light, in accurately stoppered bottles. Each fluid drachm contains $\frac{1}{16}$ grain of phosphorus. Dose: 3 to 12 minims.—Yearbook of Pharm., 1888, 474.

Tinctura Ferri Chloridi—Commercial Quality.—Walter Culin subjected samples of tincture of ferric chloride, procured from different stores, to examination. None of the samples gave a reaction for ferrous salt with potassium ferricyanide; eight of the samples gave reactions for nitric acid, and traces of other metals, like zinc, were detected in the same number.—Amer. Jour. Phar., March, 1889, 123.

Tinctura Ferri Chloridi—Reducing Action of Alcohol.—Griffith R. Lewis again directs attention to the reducing action of alcohol upon ferric chloride, and suggests that the alcohol be replaced by water as previously suggested by Professor Attfield. The generation of ferrous salt was shown qualitatively, no quantitative determinations having been made.—Amer. Jour. Phar., May, 1889, 241.

Soluble Essences.—Leo Eliel observes that "soluble essences" are occasionally called for, the term soluble referring to their miscibility with

an aqueous fluid without producing turbidity. These are readily made after the following formula for

Soluble Essence of Lemon.—Dissolve two ounces of oil of lemon, or whatever may be desired, in one pint of deodorized alcohol. In another bottle shake up powdered carbonate magnesia and sugar, of each three ounces, with one pint of water, and pour into the bottle containing the oil and alcohol. Agitate briskly and filter, adding to filter sufficient dilute alcohol to make up to one quart.

Soluble Essence of Tolu.—This may be prepared as follows:

Balsam tolu	3 ozs.
Alcohol	6 ozs.
Glycerin	12 ozs.
Magnesia carbonate	4 drachms.
Water,	
Alcohol q. s. ft.	2 pints.

Dissolve the tolu in the alcohol and glycerin with heat, add 12 ounces of water, and let it cool. Pour the milky liquid off from the resinous precipitate, rub with the magnesia, and filter, adding to filter enough alcohol and water in the proportion of 1 part alcohol to 2 parts of water. One ounce to 15 do. syrup simplex makes syrup tolu, U. S. P. 1870.—Phar. Rec., July 16, 1888, 213; from Ind. Pharm.

Soluble Essence of Ginger—Improved Manipulation.—John K. Williams, using by preference powdered pumice-stone, suggests the following improvement on the manipulation directed in the "Nat. Form.": In a covered flat-bottomed dish put 4 ounces fine powdered pumice to one pint of essence ginger (strength say 4 oz. to pint), stir with a square-end stick every five minutes for half an hour, then add slowly, stirring constantly, 4 ounces of water, and repeat the addition of that quantity of water every half hour until you have ad. O ij (less if you desire it); then filter through paper. A syrup is prepared from this by cold percolation.—West. Drugg., Feb. 1889, 80.

TROCHISCI.

Voice Lozenges—Formula.—According to the Chem. and Drugg., Dr. Hinkle recommends the following formula as the best for a "voice lozenge" in the ordinary hoarseness of singers and speakers. A small piece should be allowed to dissolve in the mouth just before vocal exertion:

Cubebs	½ grain,
Benzoic Acid	⅓ "
Hydrochlorate of Cocaine	$\frac{1}{10}$ "
Powdered Tragacanth	¼ "
Extract of Licorice	5 grains,
Sugar	13 "

Eucalyptol	¼ minim.
Oil of Anise	$\frac{1}{16}$ "
Black Currant paste	enough to make 20 grains.

—Amer. Drugg., May 1889, 88.

UNGUENTA.

Ointment Bases—Comparative and Special Value of Different Kinds.—L. Böhm has made experiments in order to determine the comparative or special value of different ointment bases, using for the general medication nitrate of strychnine, and local medication cartharidin and veratrin. He found that while *hog's lard* easily becomes rancid, and then becomes irritant, it gives the best results when it is designed that the medicament shall be absorbed. *Paraffin ointment* does not become rancid, does not exercise any irritant effect, and is suitable in all cases in which large quantities of water are not required, and in which an absorption of the medicament into the circulation is not desired. *Glycerin ointment* is also unchangeable, but is irritating when applied to wounds. It is particularly applicable for the preparation of salves that are to contain water, and its medicinal agents may become absorbed by prolonged friction. *Lanolin* is also unchangeable; it promotes the local action of the medicinal agents incorporated with it, but retards the absorption of the same into the circulation.—Arch. d. Pharm., April 1889, 321: from Pharm. Centralh.

A New Ointment Base—Goose Grease a Component.—Percy Wells observes that the use of goose grease as an external application, though dating from a very remote period and of admitted efficiency, has a drawback in its odor. This is overcome by combining it with cacao butter, an ointment base being thus produced which is easily liquefied on application, and which is more readily absorbed than any other fatty substance with which the author is acquainted. The goose fat is purified by melting until the small quantity of membrane it contains collects into a mass, then straining; to 3 pounds of the hot goose grease, ½ pound of cacao butter is added. This melts without further heat, the mixed fats being stirred continuously until they begin to solidify, when the stirring should be more vigorous until quite cold, a wooden stirrer being preferably used for this purpose.—Pharm. Jour. and Trans., Jan. 19, 1889, 567.

Sapolanolin—A New Ointment Base.—E. Stern gives the name "sapolanolin" to a new ointment base, which he prepares by mixing 2½ parts lanolin with 2 parts sapo kalinus, Ph. Germ. All medicinal agents commonly employed in ointments, with the exception of salicylic acid, may be incorporated with this base. Another preparation, serving as a base for salves which it is desirable should possess adhesive qualities, is called by the author

Lanolin-Wax Paste—This is prepared by incorporating 2 parts of yellow wax and 1 part of olive oil (the latter benzoinated for summer use) with 2 parts of lanolin. The light yellow salve produced has the thick, sticky consistence of the adhesive wax used by hair dressers, and may be mixed with most medicinal agents without suffering change in its consistence. If tar is to be introduced, however, the proportion of wax must be somewhat increased.

Lanolin Injections may be made with 1 p. lanolin and 3 p. almond oil, suitable medicinal agents (salicylic acid, sulphate of zinc, etc.,) being incorporated with this.—Arch. d. Pharm., April 1889, 319: from Pharm. Centralh.

Ointments—Incorporation of Tragacanth.—P. Vigier observes that in preparing ointments composed of vaselin, glycerin, oxide of zinc, and gum tragacanth, it is indispensable to add a small amount of water, but this should be done with certain precautions. He advises that the gum be triturated with the glycerin and a small quantity of water, and the mass thus obtained mixed with the oxide of zinc already made into an ointment.—Amer. Jour. Pharm., June 1889, 287: Soc. de Phar. de Paris, April 3, 1889.

Ointments, Plasters, etc., for Skin Diseases—Unna's Preparation.—According to R. Blondel, Unna has been engaged in perfecting his topical applications for skin diseases, which are recommended in three forms, viz: "*Medicated Paste,*" "*Ointments*" spread upon muslin, and "*Plasters*" similarly prepared. The paste, used as a vehicle, prolongs the action of the medicaments, retains the secreted water upon the surface of the skin, augments cutaneous respiration, and quiets irritation. The applications are intended for prolonged use without re dressing. The *soft paste* of Unna is made as follows: Oxide of zinc, 15; glycerin, 15; gelatin, 25; water, 25. The muslin plasters are prepared by making the fabric impermeable with caoutchouc dissolved in benzol or the oleate of aluminium. M. Vigier in recent experiments on the preparation of the plasters gives the preference to a coating of soft paraffin mixed with gutta-percha dissolved in bisulphide of carbon. Unna's paste, spread on these plasters, or used as an ointment, is said to "render great service in the treatment of pruritus, eczema, intertrigo and acne."—Amer. Jour. Pharm., Jan. 1889, 17; from J. de Ph. et de Ch., Dec. 1, 1888.

Benzoated Lard—A Good Method.—John K. Williams finds the following method, suggested by Holmes, he thinks, very satisfactory for benzoating lard, far more so in fact than the officinal method. Macerate 2 ozs. of benzoin in 4 ozs. of conc. ether sulph. till dissolved; filter through paper; to the filtrate add 2 ozs. castor oil; shake, removing the cork frequently to allow the ether to pass off. One-half ounce of this ethereal benzoate will benzoate one pound of lard (not market lard, but

that rendered anhydrous by yourself from the leaf). Add the benzoate when the lard is nearly cold.—West. Drugg., Feb., 1889, 81; from Pro. Conn. Phar. Assoc.

Adeps Benzoatus—Preparation with True Sublimed Benzoic Acid.—According to E. Utescher, adeps benzoatus is best prepared by dissolving one part true sublimed benzoic acid in one hundred parts melted lard; such a preparation possesses a finer appearance, more pleasant odor, less reducing action (on salts of silver), is of uniform quality, and keeps as well as the preparation made with benzoin.—Amer. Jour. Pharm., May, 1889, 246; from Apoth. Ztg., 1889, 280.

Petrolatum Cerate—Preparation.—Nicot finds a petrolatum cerate, made according to the following formula, to be a very unctuous and homogeneous preparation of immaculate whiteness. He adds that petrolatum, which is a good excipient in most ointments, need not be thought out of place for cerate. His formula is: White petrolatum, 500 gm.; oil of sweet almonds, 50 gm.; white wax, 50 gm. Melt with gentle heat, and mix in a warm mortar, adding slowly 50 gm. of rose-water. For *cold cream* the white wax should be replaced with spermaceti.—Amer. Jour. Pharm., April, 1889, 175; from Bull. gen. Thérap., Feb., 1889.

Lanolin Ointments—Permeability.—A. Ball describes some tests made with a view to determine the permeability of lanolin ointments, made with and without water to permeate animal membrane. The results in each case showed that the medicinal agent permeated the septum with ease, and he advocates its use for making ointments of various kinds, and particularly as a diluent for oleates. On account of its comparatively easy miscibility with water, salts that have hitherto not been conveniently used in ointment form may be readily incorporated; thus, for instance, solution of permanganate of potassium is not reduced. If stirred with hot water, in a mortar it readily forms a cream, which suitably perfumed forms an efficient "hair cream."—Pharm. Jour. and Trans., May 25, 1889, 949.

Lanolin Toilet Cream—Preparation and Uses.—Fassati communicates the following formula for a lanolin toilet cream, which he declares to be "very efficacious for tan, pimples, acne, and other simple affections of the skin:" Lanolin, 5 gm., sulphur (precip.), 5 gm., oil of sweet almonds, 5 gm., oxide of zinc, 2.50 gm., ext. violet, 50 cgm., ext. alkanet, q. s. to obtain a flesh tint. It should be applied as a very thin coat, over which starch or steatite may be powdered. The lanolin makes it easily absorbable, and its color renders it suitable for use in the day-time.—Amer. Jour. Pharm., Nov. 1888, 562; from Arch. d. Pharm., Oct. 5, 1888.

Unguentum Aquæ Rosæ—Improved Formula.—William Stengelin furnishes the following formula, which is stated to yield an excellent preparation:

Expressed oil of almond	4 ounces.
White wax	1 ounce.
Spermaceti	6 drachms.
Distilled water	1½ ounces.
Oil of bergamot	5 drops.
Otto of rose	5 drops.

In order to obtain it of a light, frothy consistence, it is recommended to beat it with a wooden stirrer having a perforated blade, which should be dexterously worked, and is afterward readily cleaned.—Amer. Jour. Pharm., March 1889, 128.

Diachylon Ointment—Selection of Oil with a view to Keeping Qualities.—With the view to ascertain the keeping qualities of diachylon ointment prepared with different vegetable oils, E. Dieterich has made experiments, using for its preparation expressed oil of almond, peanut, cottonseed, sunflower, walnut, linseed, olive, poppy, rape, sesame, and castor oil. The preparations that showed the least acid and rancidity and consequently the best flavor, after an exposure of 8 weeks, were those made with olive oil (comm.) and with castor oil, the latter being the best. The author's results are shown in a table, which may be consulted in Amer. Drugg., July, 1888, 133; from Pharm. Post.

Unguentum Diachylon—Improved Formula.—A. Kremel highly recommends the following formula as producing diachylon ointment of superior and homogeneous consistence: 1 part litharge is boiled in the usual manner with 2 parts each of lard and olive oil, and sufficient water to complete saponification, and evaporation of the water; it is then strained, allowed to cool, stirred gently until nearly white, and perfumed with the necessary quantity of oil of lavender.—Arch. d. Phar., June, 1889, 512; from Phar. Post, 22, 226.

Unguentum Oleo-Resinæ Capsici—B. P. C. Formula.—Take of oleoresin of capsicum, 1 oz.; yellow wax, ½ oz.; benzoated lard, 4 ozs. Melt the wax and lard at a low temperature, add the oleo-resin, mix thoroughly, and, if necessary, strain through muslin. Stir until cold.—Yearbook of Pharm., 1888, 476.

Unguentum Boroglycerinatum—Formula.—Köhler proposes an ointment of boroglyceride as a substitute for Lister's boric acid ointment. 10 p. boric acid are heated for 10 minutes with 30 p. of glycerin (s. g. 1.23) at the boiling point of the mixture. Water is added to make up the original weight to 40 p. The mixture is allowed to cool to 50° C., and 40 p. of lanolin are incorporated, followed by 20 p. of paraffin ointment. The product has the appearance of cold cream, is permanent, and far more active than the boric acid ointments prepared heretofore.—Arch. d. Pharm., Oct. 1888, 899; from Schweiz. Wochenschr. f. Pharm. 26, 261.

Ung. Calcii Chloridi—Formula.—Dr. Lier recommends chloride of calcium ointment in the treatment of eczema, prepared as follows: Ung. zinci 20, talc 5, ol. cadinum 5, calcii chloridum 2, and water 10 gm.—Amer. Jour. Phar., November 1888, 583; from Monatsh. f. Dermat.

Unguentum Iodi—Experiments with Different Bases.—Charles W. Cannon has experimented with lard, lanolin and petrolatum as the base for iodine ointment; and after keeping the ointments under various conditions in the dark, or exposed to diffused daylight or to sunlight, determined the amount of iodine by dissolving it in alcohol and estimating it with volumetric solution of sodium hyposulphite. Lanolin and lard yielded the iodine to the solvent quite readily, while petrolatum persistently retained a portion of it. The largest amount of iodine was invariably recovered from the lanolin, and this is recommended as the best base for iodine ointment; the well known qualities of lanolin furnish additional reasons for its use in this connection.—Amer. Jour. Pharm., March 1889, 128.

Iodide of Potassium Ointment—Cause of Change.—Coseera has made comprehensive experiments to determine the cause of the rapid development of yellow color in iodide of potassium ointment. He finds that the view advanced by many that the change is due to the combined influence of carbonic acid and water, thereby forming hydriodic acid, which in its turn decomposes, is erroneous. He regards it as indisputable that the cause of change is the acidity of the ointment body, such acidity either pre-existing or forming very shortly by the action of atmospheric oxygen. The correctness of this view is supported by the circumstance that iodide of potassium ointment prepared with pure paraffin (petrolatum?—REP.) remains unchanged indefinitely.—Arch. d. Pharm., Nov. 1888, 1043; from L'Orosi, 1888, 236.

Mercurial Ointment—Assay.—Kremel recommends the following method of assay for mercurial ointment: Weigh 3 gm. of the ointment into a small tared flask, add 50 c.c. alcoholic potassium hydrate solution and heat in a water-bath; after a short time the fat is saponified and the solution can be easily poured off from the separated mercury, which is washed a few times with alcohol, finally with ether, and then the flask and contents are dried and weighed.—Pharm. Post, 1889, 227.

For the same purpose E. Dieterich recommends the following: To one gram ointment weighed into a small beaker are added 60 gm. ether, 5 gm. alcohol and 6 to 8 drops hydrochloric acid; to facilitate solution of the fat, slight heat is applied; the beaker is covered with a watch-crystal and allowed to stand until the liquid becomes clear, when it is carefully decanted from the metallic deposit, the latter washed by decantation with some of the above mixture, finally with ether, dried at 30° to 40° and weighed.—(Helf. Ann.) Pharm. Centralhalle, 1889, 267.

Blue Ointment—Use of Metallic Potassium to Hasten the Extinction of the Mercury.—The recommendation of L. Jacquemaire to add 0.1 per cent. of metallic potassium to the mercury in order to facilitate the extinction of the latter, has induced E. Bosetti to try the experiment, both with potassium and with sodium. His results are not favorable to the proposition, the mercury is divided only superficially, and the mass assuming a frothy appearance, resists final extinction even when triturated during several days. Arch. d. Pharm., Aug. 1888, 704; from Phar. Centralh., 1888, 335.

Unguentum Hydrargyri—Use of Oleic Acid to Facilitate the Division of Mercury.—Leo Eliel finds that instead of using 10 per cent. of old ointment, as is directed by the U. S. Phar., for the extinction of the mercury, oleic acid is to be preferred, and that it insures the rapid extinction of the mercury. He believes, in fact, that the rapid extinction by the aid of old ointment is due to the presence of this acid. The addition of 1 per cent. only is necessary.—Phar. Rec., July 16, 1888, 213; from Ind. Phar.

Mercurial Ointment—Preparation with the aid of Lanolin.—Mercurial ointment is made by G. Greuel by triturating 100 gms. mercury with 15 gms. *anhydrous* lanolin, containing 20 per cent. olive oil, until the mercury is extinguished under a lens magnifying 5 diameters, and incorporating with an *anhydrous* semi-fluid mixture of 115 gms. lard and 70 gms. mutton suet. The success of the method depends upon using material entirely free from water; one kilogram ointment can be made in from one to one and a half hours.—Amer. Jour. Phar., May 1889, 247; from Pharm. Centralhalle, 1889, 127.

Mercurial Ointment—Admixture with Glycerite of Starch.—Preudhomme observes that a mixture of mercurial ointment and glycerite of starch is not homogeneous as ordinarily prepared, but may be made so by the addition of a small quantity of lanolin.—Amer. Jour. Phar., June 1889, 287; from Soc. de Phar. de Paris, April 3, 1889.

Unguentum Hydrargyri Oxidi Flava—Satisfactory Formula.—R. Wright has experimented to determine a formula for yellow oxide of mercury ointment, for which (in Great Britain, Rep.) there is no authoritative formula. Making such an ointment of the strength of unguentum hydrargyri oxidi rubri, the most satisfactory product is obtained with a base composed of 1 part of yellow wax and 7 to 16 parts of soft paraffin, according to the prevailing temperature.—Yearbook of Pharm, 1888, 397–398.

VINA.

Vinum Chinæ—Improved Process of Preparation.—A. Kremel recommends the following process and formula for preparing a wine of cinchona that has the full activity of the bark and remains clear indefinitely:

500 grams of cinchona bark are mixed with 50 grams of calcium hydrate and 500 grams of 70% alcohol. After macerating 2 or 3 days, 10 liters of wine are added, and the mixture is shaken frequently for 8 days. It is then filtered and tartaric acid is added in the proportion of 7 grams to each 1000 grams of filtrate. After standing for 8 days it is again filtered, and then retains its brightness unchanged.—Arch. d. Pharm., June 1889, 513; from Pharm. Post.

Vinum Condurango—Formula Proposed for the Germ. Pharmacopœia.—The Pharmacopœia Commission of the German Apothecaries Society, propose the preparation of a condurango wine, by macerating 1 part of finely cut condurango bark in 10 parts of sherry wine, for eight days, expressing and filtering. So obtained it is a fluid, having a yellow-red color, and the odor—particularly when heated—of the bark.—Arch. d. Pharm., July 1888, 651.

Orange Wine—Preparation.—In the German colony of Blumenau, Brazil, orange wine is prepared as follows: To make a cask of wine, between 800 and 1000 oranges are strongly expressed, a syrup, made by boiling 60 lbs. of sugar with 5 gallons of water, skimming, and allowing to cool, is added, and the whole allowed to ferment. When fermentation is completed, and the wine has become clear, it is bottled.—Amer. Drugg., July 1888, 132.

MISCELLANEOUS FORMULAS.

Salol Tooth Powder—Formula.—The following formula for salol tooth powder is given in "Dental Reg.": Salol, 3; powdered sepia, 6; prepared chalk, 24; carbonate of magnesia, 16; powdered sugar, 6 parts.—Amer. Jour. Pharm., Aug. 1888, 409.

Odontalgic Paste—Formula.—The following formula for a toothache remedy is given in "Bull. Gén. Thér.": Arsenious acid, 2 gm.; hydrochlorate of cocaine, 2 gm.; crystallized menthol, 0 5 gm.; and sufficient glycerin to make a paste. Introduced into the cavity of the tooth, this causes the pain to rapidly disappear.—Amer. Jour. Pharm., Aug. 1888, 409.

Mouth Wash—Formula.—The following formula for a mouth wash, for shrinking of the gums, is given by various French journals of pharmacy: Tannic acid, 8 gm.; tr. iodine, 5 gm.; iodide potass., 1 gm.; tr. myrrh, 5 gm.; rose-water, 200 gm.; mix. A teaspoonful in a third of a tumbler of water.—Amer. Jour. Pharm., Dec. 1888, 614.

Fragrant Sulphur Balsam—Modification of the Common Formula.—H. Bornträger observes that the medicinal sulphur balsam prepared by heating together sulphur with Venetian turpentine and oil of turpentine, is of a very disagreeable odor and taste. By substituting for the oil of turpentine olive oil, a pleasant, fragrant product results.—Chem. techn. Ztg., 1888, 739.

English Smelling Salts—Preparation.—According to E. Mylius, English smelling salts consist almost exclusively of ammonium carbonate, leaving only a slight residue, on evaporation, of ammonium bi-carbonate. A superior product can be made by very carefully subliming the commercial carbonate, so that only the carbamate is volatilized.—Amer. Jour. Phar., Aug., 1888, 403; from Pharm. Ztg., 1888, p. 359.

Corrosive Sublimate Bandages—Liability to Change.—These bandages after a time contain the mercuric chloride in an insoluble form; from the results of Haupt, the material used for the bandage appears to have some effect on this change. Wadding after seven months retains one-half of the mercuric chloride in soluble form; with mull this point is reached after five months, and with cambric in about three months; this change gradually becomes complete, as specimens (one year old) contained either very small quantities or none at all. To preserve the solubility of the $HgCl_2$, additions of ardium chloride or tartaric acid are made. In examining bandages which should contain 0.4 per cent. $HgCl_2$ it was observed that the quantity never exceeded 0.335 per cent., indicating a loss of 16 per cent. occasioned by drying the impregnated material.—Phar. Centralh., 1888, 458.

Analgesic Cotton—Preparation.—Eller gives the following formula for analgesic cotton: Solution of cocaine (3 per cent.), 30 gm.; morphine sulph., 0.8 gm.; absorbent cotton, 30 gm. Dissolve the morphine in the cocaine and soak the cotton in the solution. It may be made into a small ball and introduced into the cavity of an aching tooth, or, previously moistened, may be used in like manner for earache.—Amer. Jour. Phar., Dec. 1888, 615; from Union Méd., Oct. 20, 1888.

Calendulized Lint—A New Antiseptic Dressing.—Frank G. Mumma suggests "calendulized lint" as an antiseptic dressing. Calendula in coarse powder, 12 parts, is percolated with dilute alcohol until 82 parts of tincture are obtained; add to this 6 parts of glycerin, saturate with the mixture 1 part of lint, and expose to the air until the alcohol and water have evaporated.—Amer. Jour. Pharm., Dec. 1888, 609.

Antiseptic Sponges—Preparation for Gynæcological Operations—The following method for preparing antiseptic sponges is given in "Pharm. Centralh." (1888, 558). The sponges are placed for two hours in a solution composed of corrosive sublimate 1.0, carbolic acid 5.0, alcohol 60.0, water 500.0; after expression they are allowed to dry in the air and may be impregnated with one of the following solutions: I. Boric acid 15.0, boiled water 500.0; II. Tannin 30, boiled water 500.0; III. Solution ferric chloride 40.0, boiled water 500.0.

Cements and Pastes—Practical Formulas.—Eugene Dieterich gives the following formulas:

1. Cement for porcelain, marble, alabaster, glass, etc.

a.	Caustic lime	10 parts.
	White of eggs, fresh	25 "
	Plaster of Paris	55 "
	Water	10 "

Reduce the caustic lime to powder, and triturate it with the white of egg to a uniform paste. Dilute this with the water, quickly incorporate the plaster of Paris, and use the cement at once.

[The materials to be cemented must be ready at hand. The broken surfaces should be dampened with water so that the cement will at once adhere. The pieces must be firmly pressed together and kept in this position for about twelve hours.]

b.	Casein, fresh	100 parts.
	Silicate of sodium, syrupy	q. s.

Mix the casein in a mortar with enough silicate of sodium to produce a uniform honey-like mass.

This cement is transparent, and keeps for some time. It is not waterproof.

2. Cement for meerschaum.

Use the casein cement described under 1, *b*, with the addition of five parts of calcined magnesia for 100 parts of casein.

3. Cement for paper, woven fabrics, leather, etc.

Borax	5 parts.
Water	95 "
Casein	q. s.

Dissolve the borax in the water, and incorporate enough casein to produce a honey-like mass.

4. Cement for horses' hoofs.

Ammoniac, purified	30 parts.
Turpentine (oleo-resin)	10 "
Gutta-percha	60 "

Melt the first two ingredients in a steam-bath and gradually add, while stirring, the gutta-percha. For use, soften the mass in hot water and then press into the previously clean hoof-fissure. The cement may be colored black by incorporating about 2 parts of lamp-black.

5. Cement for leathern belts, leather upon wood or metal, etc.

Gutta-percha	20 parts.
Bisulphide of Carbon	50 "
Oil of Turpentine	10 "
Asphalt (Syrian), powd.	20 "

Dissolve the gutta-percha as far as possible in the mixed liquids, then

add the asphalt. After several days' standing, the mass will be homogeneous. Should it be too thin, evaporate it somewhat so that it may be of the consistence of honey when cold.

Before applying this cement to leather, the latter must be deprived of fat by means of benzin, upon the side to be cemented.

6. Cement for tightening iron vessels.

Iron Filings	85 parts.
Sublimed Sulphur	10 "
Chloride of Ammonium, powd	5 "
Water	q. s.

Mix the solids and make a thick mass with water. Apply this to the fracture, previously cleaned by scraping. After standing eight days the cement will be as hard as iron, and will resist boiling. It is very serviceable for tightening steam-apparatus with leaky bolts.

7. Cement for coating boiler-coverings, etc.

Litharge	85 parts.
Boiled Linseed Oil	15 "

Triturate them in a warmed mortar until a plastic mass results.

8. Cement for retorts, etc.

Clay, powd. and sifted	60 parts.
Rye Flour	30 "
Bran	10 "

Mix them well. When wanted, take a sufficient quantity and mix it with water to a dough to be applied to the retort or flask.

9. Paste for affixing paper to tin.

Mucilage of Acacia	95 parts.
Glycerin	5 "

The tin must be cleaned before the label is pasted on.—Amer. Drugg., Oct. 1888, 196.

Starch Paste—Preparation in Permanent Form for Volumetry, etc.—Gastine prepares a permanent starch paste for volumetric as well as technical purposes, by mixing 50 parts potato starch and 0.1 part biniodide of mercury with a little water and adding this mixture free from lumps to 10,000 parts boiling water (for technical use less water is taken and the paste boiled); after standing the liquid is decanted. This solution will not lose its sensitiveness if kept for a year.—Rdsch., 1888, 783; from Bull. Soc. Chim.

Adhesive Mixture—Formula.—Kayser recommends a solution of 30 p. of rock candy in 100 parts of solution of silicate of sodium, as forming

an excellent adhesive mixture for paper on paper, leather, metal (tin boxes), wood, etc.—Rundschau, 1888, 574.

Rubber Goods—Method of Mending.—The *Revue Scientifique* says that laboratory articles of rubber may be repaired by filling the cracks or torn places with a preparation composed of 16 parts of sulphide of carbon; 2 of gutta percha; 4 of India rubber, and 1 of fish glue. Open places are filled by applying successive layers with a brush. Cut or broken places are filled up and the edges held together with a moderately tightened thread, which may be withdrawn in a day or two, when any projecting substance may be removed with a sharp knife.—Amer. Jour. Pharm., Oct. 1888, 512.

Sealing Wax—Formula for a Compound Indifferent to Alcohol.—The following formula yields sealing wax that is not affected by alcohol: 5 parts beeswax, and 1 part each carnauba-wax and paraffin are melted together and heated with 5 parts red-lead and 2 parts prepared chalk, with constant stirring until the mixture becomes thick.—Rdsch., 1889, 176.

Ink for Type-Writer Ribbons.—Isidore Furst communicates some interesting and practical information respecting type writer ribbons, and the ink most suitable for the purpose. The constituents of an ink for type-writer ribbons may be broadly divided into four elements: 1, the pigment; 2, the vehicle; 3, the corrigent; 4, the solvent. The elements will differ with the kind of ink desired, whether permanent or copying. For

Permanent (or Record) Ink, any finely divided, non-fading color may be used as the pigment, vaseline is the best vehicle, and wax the corrigent. In order to make the ribbon last a long time with one inking, as much pigment as feasible should be used. Suppose we wish to make black record ink. Take some vaseline, melt it on a slow fire or water-bath, and incorporate by constant stirring as much lampblack as it will take up without becoming granular. Take from the fire and allow it to cool. The ink is now practically finished, except, if not entirely suitable on trial, it may be improved by adding the corrigent wax, in small quantity. The ribbon should be charged with a very thin, evenly divided amount of ink. Hence the necessity of a solvent, in this instance a mixture of equal parts of petroleum benzin and rectified spirit of turpentine. In this mixture dissolve a sufficient amount of the solid ink by vigorous agitation to make a thin paint. Try your ink on one extremity of the ribbon; if too soft, add a little wax to make it harder; if too pale, add more coloring matter; if too hard, add more vaseline. If carefully applied to the ribbon, and the excess brushed off, the result will be satisfactory. On the same principle other colors may be made into ink; but for delicate colors, albolin and bleached wax should be the

vehicle and corrigent respectively. The various printing inks may be used if properly corrected. They require the addition of vaseline to make them non-drying on the ribbon, and of some wax if found too soft. Where printing inks are available, they will be found to give excellent results if thus modified, as the pigment is well milled and finely divided. Even black cosmetic may be made to answer, by the addition of some lampblack to the solution in the mixture of benzin and turpentine. For

Copying Inks, aniline colors form the pigment; a mixture of about three parts of water and one part of glycerin, the vehicle; transparent soap (about one fourth part) the corrigent; stronger alcohol (U. S. P.) (about six parts), the solvent. The desired aniline color will easily dissolve in the hot vehicle, soap will give the ink the necessary body and counteract the hygroscopic tendency of the glycerin, and in the stronger alcohol the ink will readily dissolve so that it can be applied in a finely divided state to the ribbon, where the evaporation of the alcohol will leave it in a thin film. There is little more to add. After your ink is made and tried—if too soft, add a little more soap; if too hard, a little more glycerin; if too pale, a little more pigment. Probably, printer's *copying* ink can be utilized here likewise, because every one now has the means to modify and correct it to make it answer the purpose.—Amer Drugg., Nov. 1888, 201.

Blue Prints—Method of Changing the Color to Brown.—Gauthier-Villars gives the following formula for the conversion of the blue color of cyanotypes into brown:

1. *Solution for the Preparation of the Paper.*

Potassium ferritartrate	15 gm.
Potassium ferridcyanide	12 gm.
Distilled Water	250 c.c.

2. *Solution for Bleaching the Prints.*

Ammonia (22°)	100 c.c.
Distilled Water	900 c.c.

3. *Solution for Coloring Brown.*

Tannin	10 gm.
Distilled Water	500 c.c.

The blue prints are first well washed and then dipped into solution No. 2, until the image is completely bleached. It is then washed again and immersed in the tannin-bath solution 3, where it is left until it has assumed the desired tone, which may not be until after twelve hours. If at the end of this time the desired depth shall not yet be attained, a few drops of ammonia should be added. Finally, the print is washed with plain water. To blacken blue prints, Mr. Roy's method is recommended, bleaching yellow in a solution of 4 gm. caustic soda to 100 c.c. water, then blackening in a solution of 4 gm. of tannin to 100 c.c. water.—Amer. Drugg., Nov. 1888, 205; from "Moniteur de la Photographie."

MATERIA MEDICA.

A. Vegetable Drugs.

GENERAL SUBJECTS.

Drugs of British Sikkim.—During a recent visit to the neighborhood of Darjeeling, David Hooper met with a number of drugs which are not commonly known in other parts of India. The portion of the Himalayan mountain zone known as Sikkim, in which the Darjeeling district is situated, has a rich and extensive flora. It embraces the plains called Terai at the south of the hills, and a gradual series of mountain ranges up to 10,000 feet above sea level. The vegetation ranges from the tropical cotton, banyan, figs, bamboo, through forests of sâl, toon, bombax, laurels, maples and oaks. Among such a variety of plants it is not a matter of surprise to find many of them yielding products used in medicine, either by the natives themselves, or collected for purposes of trade, and Mr. Hooper describes quite a number that have come under his observation, which may be briefly enumerated as follows:

Tinospora cordifolia, Miers, (*Menispermaceæ.*)—The wood and stem root are used to cure cattle of pains in the stomach.

Gynocardia odorata, R. Br. (*Bixineæ*).—The pulp of the fruit is used to poison fish, but may be eaten after boiling in water. The seeds yield chaulmugra oil, but are not collected here. The bark is supplied to the Mauritius for use in fever. It contains starch and tannin, and its infusion has the odor of essential oil of bitter almonds.

Schima Wallichii, Choisy (*Ternstrœmiaceæ*)—The fiber of the black bark of this large tree is made up of an abundance of white, needle-shaped cells, which are easily detached and act as cowhage in producing painful irritation, when brought in contact with the skin.

Randia Dumetorum, Lam. (*Rubiaceæ*).—The fruit is used to kill fish.

Pæderia fœtida, Willd. (*Rubiaceæ*).—The fruit is used to blacken the teeth, and is said to be a specific against toothache.

Pentapterygium serpens, Bth. (*Vacciniaceæ*).—The bulbous root is used to cure cattle of lameness, in form of poultice.

Teucrium Anacrostachyum, Wall. (*Labiatæ*).—The sweet juice which exudes from the yellow-white flowers is sucked by the Paharia herdsmen.

Colebrookia oppositifolia, Sm. (*Labiatæ*).—The down on the stem and leaves is used to extract worms from bad sores on the leg.

Polygonum molle, Don. (*Polygonaceæ*).—The shoots are eaten; they resemble rhubarb in flavor.

Cinnamomum Tamala, Nees. (*Lauraceæ*).—The aromatic bark is largely

exported under the name of "taj." The aromatic leaves are also sold in the bazaars under the name of "tespet."

Macaranga sp. (*Euphorbiaceæ*).—The leaves, which turn golden red before falling, in December, are used to poison fish. The juice of the fresh leaves is said to blister if applied to the skin.

Gum-bearing Plants.—A large number of trees in the forests of British Sikkim afford useful gum. Among them the author enumerates the following: *Bauhinia Vahlii, Albizzia procera, Albizzia stipulata, Croton oblongifolius, Macaranga gummiflua, Ostodes paniculata, Garcinia stipulata, Bombax malabaricum, Stercula villosa, Garuga pinnata, Odina wodier, Spatholobus Roxburghii, Butea frondosa.*

Shorea robusta, Gaertn., (*Dipterocarpeæ*).—This is the sâl tree, noted for its valuable timber. It yields a quantity of resin, found in large pieces—often 30–40 cubic inches in size—in the ground at the foot of the trees.

Pterospermum acerifolium, Willd. (*Sterculiaceæ.*)—The soft tomentum of the leaves ls used to stop bleeding in wounds.

Canarium Bengalense, Roxb., (*Burseraceæ*).—The light yellow, soft, tenacious and slightly fragrant resinous exudation found on the bark of this huge forest tree is used as an incense.

Gouania leptostachya, D. C., (*Rhamnaceæ*).—The leaves are used to make poultices for sores.

Millettia pachycarpa, Bth., (*Leguminosæ*).—The roots are used for killing fish.

Entada scandens, Bth. (*Leguminosæ*).—The large seeds of the long (often two feet or more) fruit are eaten after long roasting and soaking, to extract the poison. They are also used for a hair-wash.

Dichroa febrifuga, Lour. (*Saxifragaceæ*).—The root-bark is used as a febrifuge, but it has to be taken in very large doses in form of decoction. It contains starch, but no tannin, and is almost tasteless.

Terminalia Chebula, Retz. (*Combretaceæ*).—The fruits are used as a medicine for sore throat, and the kernels are eaten.

Eugenia obovata, Wall. (*Myrtaceæ*).—The ground bark is used like smelling salts or snuff for headache.—Pharm. Jour. and Trans., Sept. 22, 1888, 225–226.

Useful Brazilian Plants.—Dr. Theodor Peckolt describes a number of useful Brazilian plants, viz.: *Bactris genomoides,* var. *setosa,* Dr.; *B. arundinacea,* Trail.; *B. cuspidata,* Mart., var. *tenuis,* Wallace; *B. cuspidata,* Mart., var. *Marajá,* Barb. Rodrig; *B. tomentosa,* Mart.; *B. Piranga,* Trail.; *B. macrocarpa,* Wallace; *B. Marajá,* Wallace; *B. Marajá,* Mart., var. *sobralensis,* Trail.; *B. Marajá,* Mart., var. *Limnaia,* Trail.; *B. glaucescens,* Dr.; *B. chloracantha,* Poepp.; *B. acantho-*

carpa, Mart.; *B. piscatorum*, Wedd.; *B. setosa*, Mart.; *B. major*, Jacq., var. *infesta*, Mart.; *B. mundata*, Mart.; *Guilielma speciosa*, Mart.; *G. speciosa*, Mart., var. *mitis*, Dr.; *G. speciosa*, Mart., var. *flava*, Barb. Rodrig; *G. insignis*, Mart.; *Acrocomia sclerocarpa*, Mart.; *A. sclerocarpa*, Mart., var. *Wallaceana*, Dr.; *A. intumescens*, Dr.; *A. glaucophylla*, Dr.; *Martinezia caryotifolia*, H. B. Kth.; *Glasiova Martiana*, Glaz. (*Cocos Weddeliana*, H. Wendl.); *G. insignis*, Dr.; *Cocos Mikaniana*, Mart.; *C. syagrus*, Dr.; *C. inrajai*, Trl.; *C. botryophora*, Mart.; *C. botryophora*, Mart., var. *ensifolia*, Dr.; *C. acrocomioides*, Dr.; *C. comosa*, Mart.; *C. Procopiana*, Glaz.; *C. flexuosa*, Mart.; *C. campestris*, Mart.; *C. oleracea*, Mart.; *C. coronata*, Mart.; *C. Martiana*, Dr. et Glaz.; *C. Romanzoffiana*, Cham.; *C. Datil*, Gr. et Dr.; *C. australis*, Mart.; *C. Yatay*, Mart.; *C. schizophylla*, Mart.; *C. leiospatha*, Barb. Rodr.; *C. capitata*, Mart.; *C. eriospatha*, Mart.; *C. Petreæ*, Mart.; *C. speciosa*, Barb. Rodr.; *C. pityrophylla*, Mart.; *Diplothemium caudescens*, Mart.; *D. maritimum*, Mart.; *D. campestre*, Mart., var. *genuinum*, Dr.; *Attalea funifera*, Mart.; *A. compta*, Mart.; *A. indaya*, Dr.; *A. humilis*, Mart., var. *typica*, Dr.; *A. spectabilis*, Mart., var. *polyandra*, Dr.; *A. spectabilis*, Mart., var. *monosperma*, Barb. Rodrig; *A. princeps*, Mart.; *A. phalerata*, Mart.; *A. microcarpa*, Mart.; *A. excelsa*, Mart.; *A. speciosa*, Mart.; *A. Humboldtiana*, Spruce; *Orbignia racemosa*, Dr.; *O. Eichleri*, Dr.; *Maximiliana Maripa*, Dr.; *M. regia*, Mart. The above plants are described in a series of papers, which may be consulted in Pharm. Rundschau, Sept. 1888, 202–207; Febr., April, May and June, 1889, 34–38, 89–92, 110–113, and 133–134.

Egyptian Drugs.—At a meeting of the Pharmaceutical Society of Great Britain, William Martindale exhibited some drugs from the Cairo Bazaar, among which opium, poppy capsules, soap root, the root of *Capparis Sodada*, styrax bark, pods of *Acacia arabica*, etc., etc., a description of which will be found in Pharm. Jour. and Trans., March 16, 1889, 743–744.

FUNGI.

Ergot—Drying and Preservation.—According to F. Alpen, ergot should be dried in thin layers, the last portion of moisture being removed by exposure over lime or sulphuric acid in a desiccator. So dried, and stored in corked yellow bottles, the ergot will retain its superior quality for several years.—Chem. Rep., 1888, 233.

LYCOPODIACEÆ.

Lycopodium—Proximate Constituents—According to an analysis by Alfons Langer, the sporules of lycopodium clavatum have the following components:

1. They yield 1.155 per cent. of neutral mineral constituents, consist-

ing mainly of the phosphates of potassium, sodium, calcium, magnesium, iron and aluminium, together with small quantities of sulphate of calcium, chloride of potassium, silicate of aluminium, and traces of manganese.

2. They contain 49.34 per cent. of green-yellow fixed oil, having acid reaction, and composed of 80 to 86.67 per cent. of an oleic acid, variable quantities of glycerin, and a mixture of solid fat acids. The oleic acid ($C_{16}H_{30}O_2$) yields a lead salt soluble in ether, belongs to the oleic acid series, and a constitution which may be designated as *a* decyl-β-isopropyl-acrylic acid. Myristic acid appears to be the principal component of the mixtures of solid fat acids.

3. They yield monomethylamine by boiling, as well as by simply warming with potash solution, s. g. 1.32.

4. The dry commercial drug yields 0.857 per cent. of nitrogen.

5. Lycopodium contains at least 2.12 per cent. of cane sugar.

6. The sporules have the property of condensing oxygen in form of ozone upon their surface, as is evident from the fact that when macerated with alcohol they produce acetaldehyd from it.

7. By the action of melting caustic potassa the lycopodium sporules yield:

a. A brown, resinous body, free from nitrogen, having a fæcal odor and acid reaction.

b. A benzolderivative, forming needle-shaped crystals, which are soluble in ether and water, insoluble in chloroform, contain no nitrogen, and are closely related to protocatechuic acid.—Arch. der Phar., March 2 and April 1, 1889, 241–266 and 289–309.

FILICES.

Aspidium Filix mas, L.—*Constituents.*—G. Daccomo obtained by methods which he described, from the rootstock of *Aspidium filix mas*, L., besides the filicic acid of Trommsdorff, black resin, red resin, glucose, tannin, and an indifferent oily body, a new body, having the composition $C_{20}H_{34}O$, to which he gave the name

Aspidol.—It is insoluble in alkalis, easily soluble in ether, benzene, chloroform, light petroleum, and hot alcohol. It is optically active in a 3 per cent. chloroform solution $[a]_D = -24.08$. The filtrate from the precipitate of aspidol was fractionated into three parts. The first fraction, 130–190°, was a yellow oil with a strong odor and acid reaction, which did not reduce silver nitrate. The second fraction, 220–290°, was a beautiful green oil, which gradually became brown; it has the empirical formula $(C_{27}H_{46}O_3)_n$. The third fraction above 3000° (at 200 mm. pressure) (corresponds with the formula $(C_{34}H_{56}O_2)_n$. The

Filicic Acid, as obtained by the author, has the composition $C_{14}H_{16}O_5$. It is a yellowish, odorless, crystalline powder, melts at 179–180° (uncorr.), and is insoluble in water, almost insoluble in absolute alcohol,

moderately soluble in glacial acetic acid, ether, amyl alcohol, and toluene, and readily in chloroform, carbon bisulphide, and benzene. The *benzoyl* derivative, $C_{21}H_{20}O_6$, separates from dilute alcohol in colorless crystals, melts at 123°, and is very readily soluble in ether, but insoluble in water. The *ethyl* salt, $C_{16}H_{20}O_5$, prepared by treating the acid with alcoholic potash and ethyl iodide, separates from dilute alcohol in reddish crystals, melts at 142°, and is very readily soluble in ether and benzene, but insoluble in water. The *propyl* salt melting at 158°, and the *ethylene* salt melting at 165°, resemble the ethyl salt in appearance and insolubility.

Bromofilicic Acid, $C_{14}H_{15}BrO_5$, prepared by treating the acid with bromine in glacial acetic acid solution, crystallizes from alcohol in red prisms, melts at 122°, and is very readily soluble in absolute alcohol and ether, but insoluble in water.

Anilidofilicic acid, $C_{14}H_{15}N_4OHPh$, obtained by boiling a glacial acetic acid solution of the acid with aniline, separates from alcohol in reddish-violet crystals, melts at 140°, and is soluble in alcohol and benzene, but insoluble in warer.

The *hydrazide*, $C_{14}H_{16}O.(N_2HPh)_4$, prepared by boiling an ethereal solution of the acid with phenylhydrazine, crystallizes from ether in red needles, melts at 198°, and is readily soluble in alcohol, but insoluble in water. When the acid (100 parts) is heated above its melting point (compare Luck, *Annalen*, liv. 119), or heated with water at 170–190°, it is decomposed into isobutyric acid (32.5 parts) and a compound, the composition of which is $C_{20}H_{18}O_7$. Hydrochloric acid produces the same decomposition at 150–160°. The author's results led him to the conclusion that filicic acid is probably an isobutyric acid derivative of hydroxynaphthaquinone.—Jour. Chem. Soc., 1888, 521, and 1889, 54: from Ann. di Chim. e. Pharm.

GRAMINACEÆ.

Stigmata Maydis—Determination of Sugar.—John Rea determined in the cold-water infusion of corn silk (fresh?) the sugar by means of Fehling's solution, which indicated 0.88 per cent.; after boiling the infusion for one hour with hydrochloric acid, 1.42 per cent. of sugar was found. Amer. Jour. Phar., Feb. 1889, 70.

PALMACEÆ.

Areca-nut—Alkaloidal Constituent.—According to E. Jahns, areca-nut contains three alkaloids, *arecoline* 0.07–0.1 per cent., *arecaine* 0.1 per cent., and the third one in such small quantity that it has not been possible to examine it. Arecoline, $C_8H_{13}NO_2$, identical with Bombelon's *arecan*, is an alkaline, colorless, oily liquid, soluble in water, alcohol, ether and chloroform; it is poisonous, and probably gives the drug its

tænifuge properties. Arecaine, $C_7H_{11}NO_2+H_2O$ forms permanent color-less crystals soluble in water, insoluble in absolute alcohol, ether, chloroform, benzol, and appears to be inactive.—Ber. d. D. Chem. Ges, 1888, 3404.

RESTICACEÆ

Cay-Cay—Description and Collection of Fat.—Brousmiche and Lanesan describe the "cay-cay," or the "fat-tree" of Indo-China, as being plentiful in China, Cambodia and Annam, where it attains a height of 4 and a diameter of 1 m. 20. Its fruit contains an oily almond, which the monkey and wild boar eat with avidity. The author assigns the tree to *Irvingia Harmandiana—Nat. Ord. Resticaceæ.*—The natives gather, bruise and heat the fruit and express the oil, which hardens into a waxy mass. The Annamites get but 20 per cent. of fat from it. By treating with sulphide of carbon, however, 52 per cent. of fat may be extracted. The fat is not a true wax, but resembles butter of cacao, for which it may become a substitute. It melts at 38° and solidifies at 35°, and in dry distillation gives acrolein.—Amer. Jour. Phar., Sept. 1888, 449–450: from Rev. Scientifique; Nouv. Rem., June 24, 1888.

LILIACEÆ.

Muscari comosum—Pharmacological Examination.—Curci finds the active constituent of the bulb of *muscari comosum* to be an acid closely related to quillaia and polyalic acids. The drug may find its most suitable application, as decoction, in the treatment of catarrhal affections of the respiratory passages.—Arch. d. Pharm., Aug. 1888, 750; from Ann. di Chim. e di Farm., 1888, 314.

DIOSCOREACEÆ.

Dioscorea villosa—Proximate Examination.—William Charles Kalteyer has found wild yam root to yield successively: to petroleum spirit, 0.208 per cent.; to ether, 0.450 per cent.; to absolute alcohol, 8.440 per cent.; to water, 20.16 per cent.; to dilute soda solution, 6.65 per cent.; to dilute hydrochloric acid, 0.920 per cent.; to boiling dilute sulphuric acid, glucose corresponding to 7.425 per cent. of starch. Moisture = 7.25 per cent., ash = 2.38 per cent. The constituents determined were: light colored fixed oil, crystalline wax, resins, saccharose, glucose, mucilage, albumen, phlobaphene, starch, and extractive.—Amer. Jour. Pharm., Nov. 1888, 544–545.

IRIDACEÆ.

Saffron—Adulteration with Soluble Salts.—Adrian calls attention to a new sophistication of saffron, which appears to be very remarkable. On inspection the saffron did not show the least trace of the admixture of foreign substances; it had a remarkably bright color and a very aromatic

odor. Nevertheless, it presented some physical peculiarities which attracted attention to it. It was heavy, though washing with water did not detach any insoluble matter. It was also very hygroscopic; if strongly rubbed upon white paper, it colored the latter yellow; and if compressed between the fingers so as to form a sort of ball, it retained this shape, while genuine saffron is quite elastic, and returns to its former loose-fibred state. The yellow fibres which are always found in saffron, and which are a portion of the style adhering to the stigmas, appeared to be few in number, though they could be recognized.

Examination showed that while pure saffron yielded 7.145 per cent. of ash, the suspected yielded not less than 26.4 per cent. The latter was analyzed, and the different constituents having been combined in the manner usual in analysis, led the author to regard the original adulterant as being present in the following proportions:

Borate of Sodium, cryst	13.990
Sulphate of Sodium, cryst	11.285
Tartrate of Potassium	10.096
Chloride of Sodium	0.117
Nitrate of Ammonium	3.142

Allowance was made for the salts found to occur in the ash of pure saffron, and the tartrate of potassium was *assumed* to have been originally present, while of course, the ash showed only a carbonate.—Amer. Drugg., April 1889, 69; from Jour. de Pharm., Nov. 3, 1888, 98.

Saffron—Adulteration with Soluble Salts.—E. M. Holmes draws attention to saffron adulterated with soluble salts. It is of excellent color and odor, but is recognized by giving an *immediate* orange yellow color to water, while genuine saffron communicates a lemon-yellow color more slowly; heated on platinum it deflagrates on taking fire, showing the presence of nitrate; its ash, in a crucible, fuses, that of true saffron retaining the form of the saffron filaments. The analysis is not complete. —Pharm. Jour. and Trans., Feb. 23, 1889, 666.

Saffron—Colorimetric Test for the Detection of Sophistications.—Barnard S. Proctor describes a colorimetric method for the estimation of saffron, which he believes to be serviceable for the detection of sophistications. As a standard for the comparison he uses a solution of bichromate of potassium, made by dissolving 14 grains of the salt in 2 ounces of water. This has a tinctorial power which the author has found to be exactly equal to the tinctorial power of an infusion of 1 grain of genuine saffron in two ounces of water, or of a solution made by alternately using spirit and water; the latter alternative being adopted for the extraction of the saffron, according to the following method:

One grain of saffron is placed in a vial with f.ʒij of ether; a yellow solution of no great intensity should be produced, otherwise the presence

of some aniline may be suspected. The ether is decanted, the vial is warmed till the saffron is again dry, f.ʒij of rectified spirit is poured on, and heat, short of ebullition, is applied for an hour or so; the tincture is then decanted into a 2 ounce vial. The saffron is next treated with f.ʒij of water and heated as before, the infusion being added to the previous liquor, and the extraction is continued with alternate portions of spirit and of water till the solvents cease to extract color and the fibres are nearly white. Three portions each of spirit and water usually effect a satisfactory exhaustion. The total liquors being made up to exactly 2 fluidounces should have an orange color, closely resembling the solution of bichromate, but the true value of the color cannot be judged unless both liquors are diluted with a large bulk of water. The best results, in the author's experience, are obtained by taking 8 minims of the standard liquor and diluting it with an ounce of water, half filling a test tube of about ½ inch in diameter with this diluted standard, then adding to an ounce of water 8 minims of the liquor obtained from the sample under examination; and having half filled a similar test-tube with this, holding the two tubes side by side against a sheet of white paper, standing with back to the window, and a good diffused daylight falling upon the samples. If the standard be found appreciably the darker of the two, the value of the sample under examination may be estimated by the number of minims of its liquor which it is necessary to add to the ounce of water to make the tints equal. For example: 11½ minims are equal to 8 minims of the standard; then 11½ : 8 : : 100 : 69 — or the sample contains 69 per cent. of saffron and 31 per cent. of adulterant. The author cites a number of cases, and has obtained concordant results in different experiments with the same samples. Some further experiments seem, however, to be necessary to absolutely discriminate between the saffron coloring matter and artificial coloring matter that might be used in conjunction with inert matter to sophisticate genuine saffron.—Pharm. Jour. and Trans., April 6, 1889, 801–802.

ORCHIDACEÆ.

Vanilla—Detection of Benzoic Acid.—Schimmel & Co. observe that benzoic acid crystals on vanilla beans may be distinguished microscopically from vanillin; the former are needle-shaped, the latter tabular crystals. Dilute sodium carbonate will extract the former, and on acidifying with sulphuric acid and adding a little metallic magnesium or zinc, the odor of oil of bitter almonds will be developed.—Pharm. Centralh., 1888, 537.

PIPERACEÆ.

Pepper—Existence of a Volatile Alkaloid.—See *Piperidine,* under "Organic Chemistry."

Black Pepper—Commercial Quality and Analysis.—Mr. James Edgar

Stevenson Bell communicates the details and results of the chemical and physical examination of twenty samples of commercial black pepper, procured in different parts of the country so as to make the results as representative and reliable as possible. The results of the author's chemical analysis are given in the following table:

No.	Where Ground or Obtained.	Moisture.	Ash.	Piperine and Resin.	Remarks.
1.	Philadelphia Grinder,	9.90	4.50	7.85	Pure.
2.	London, Eng., Grocery,	9.08	5.48	6.75	"
3.	Boston "	10.69	5.02	6.46	"
4.	New York "	10.29	4.98	6.84	"
5.	Philadelphia "	11.81	5.39	6.02	"
6.	" "	11.34	7.92	4.27	Adulterated.
7.	Baltimore "	12.25	7.37	4.11	"
8.	" "	11.02	5.17	5.83	Pure.
9.	Pittsburgh "	10.78	4.91	5.98	"
10.	Chicago "	9.46	5.90	6.54	"
11.	San Francisco "	10.12	5.12	6.89	"
12.	" " "	10.63	4.93	7.29	"
13.	Los Angeles "	10.86	4.63	6.96	"
14.	" " "	9.21	4.92	7.18	"
15.	" " "	9.53	4.65	7.08	"
16.	Philadelphia Drug Store.	10.14	4.87	6.98	"
17.	" " "	9.91	5.37	7.18	"
18.	" Grocery,	9.01	6.75	6.45	"
19.	" "	12.60	7.25	3.74	Adulterated.
20.	" "	11.93	8.59	3.29	"

An examination of this table shows:

(*a*) That pure pepper may contain from nine to twelve per cent. of moisture.

(*b*) That the amount of ash in pure pepper ought not to exceed six per cent.

(*c*) That pure pepper contains from five to eight per cent. of piperine and resin, and that less than 4.5 per cent. is evidence of sophistication.

The author regards the physical examination of black pepper as absolutely essential in connection with the chemical examination, a familiarity with the various adulterants used being necessary. In the samples designated as adulterated, the microscope revealed a number of abnormal structures, among which were detected pepper stems, charcoal, hulls of mustard seeds, ground corn and beans, small fragments of cocoanut shells, and various unrecognizable impurities. The impurities found were chiefly inert, and while objectionable on account of their diluent effect as well as for other reasons, were not specially deleterious.

The author draws the following conclusions:

1. The amount of moisture in pepper is so variable that it alone is no criterion by which to judge of the quality of a given sample.

2. The ash is also a variable factor, and unless quite excessive, is not a sufficient indication of impurity.

3. Excess of either ash or moisture, coupled with a marked deficiency of ethereal extract (piperine and resin) is a good indication of impurity.

4. The impurities most likely to be met with in peppers ground in this country, are those mentioned above, which are either inert or harmless.

5. Metals and alkaline earths are, as a rule, present only to a slight extent.

6. An expertly conducted physical examination must accompany the chemical in order to *thoroughly* test a sample of pepper.

7. The popular notion that ground peppers are extensively and grossly adulterated, while partly true, is mainly a false one.

8. Consumers who are willing to pay a fair price for pepper will seldom be imposed upon with an adulterated article.—Amer. Jour. Pharm., Oct. 1888, 481–484.

Black Pepper—Examination of Commercial Samples.—J. N. Zeitler obtained the following results in the examination of ten commercial samples of black pepper:

	Minimum.	Maximum.	Average.
Water	10.97	12.48	12.00
Extract	10.41	13.93	12.32
Ash	3.73	7.93	5.64
Proportion of ash soluble in HCl	2.75	25.35	11.80
Proportion of ash insoluble in HCl	0.10	1.86	0.76

—Arch. d. Pharm., April 1889, 323; from Chem. Centralbl. 1888, 1514.

Pepper—Estimation of Piberine, etc.—T. Stevenson has estimated the piperine in commercial peppers in the following manner: 50 gm. pepper are extracted with methyl alcohol; after the evaporation of the solvent the residue is treated with a cold solution of potassium carbonate, which dissolves the resinous substances, leaving the piperine; this is washed with water, recrystallized from alcohol, dried at 100° and weighed. From the alkaline solution the resin can be precipitated by hydrochloric acid. The specimens contained approximately 14 per cent. moisture; the figures relate to dry material:

	Piperine.	Resin.
Black pepper	7.14 per. cent.	1.44 per cent.
" " (Trang.)	6.62 "	0.82 "
White "	6.47 "	0.69 "
Long "	4.24 "	1.16 "

—Amer. Jour. Pharm., Oct. 1888, 513; from Ztschr. f. Nahrungsm. Unters., 1888, and "Analyst."

Cubebs—Occurrence of Immature Fruits in the Market.—C. B. Lowe has

observed the occurrence in the Philadelphia market of a drug which was represented to be cubebs. They are about one-third the size of true cubebs, with a stipe about one-third longer than their diameter, are of a dark purple color, quite shrunken in appearance, and of a cubeb odor, but much weaker taste. On examination with the microscope they are seen to contain numerous oil cells in the mesocarp, but the layer of stone cells which forms the endocarp in the true cubebs cannnot be discerned. They contain a very rudimentary seed. In the author's opinion they are cubebs which have been picked while quite immature, the present high price of cubebs, probably, having tempted the growers to put them upon the market in this condition.—Amer. Jour. Phar., March 1889, 117.

ELAEAGNEÆ.

Shepherdia argentea, Nuttall—*An Indian Food Plant—Analyses of the Fruit.*—Henry Trimble has analyzed the pleasant acidulous fruit of *Shepherdia argentea*, Nuttall, which is known under the names of "buffalo berry," "bull berry," "grains de Bœuf," etc. It has, until recently, constituted one of the staple foods of the Indians of Utah and Dakota, growing in great profusion in the region of the upper Missouri and its tributaries. The whites make a very palatable jelly from this fruit, which has some resemblance to the currant, but is hardly palatable until after one or two frosts. Both the fruit and jelly are very wholesome, and may be eaten freely without discomfort. Prof. Trimble has analyzed these fruits, and gives the results, along with the analysis of currants, as given by Blythe ("Composition and Analysis of Foods," p. 133), as follows:

	Buffalo Berries.	Currants.
Water	71.28	84.77
Nitrogenous substances	.14	0.51
Free acid	2.45	2.15
Total sugar	5.47	6.38
Other nitrogenous substances (Pectin, etc.)	.42	0.90
Undetermined	19.79	4.57
Ash	.45	0.72
	100.00	100.00

—Amer. Jour. Pharm., Dec. 1888, 593–595.

LAURACEÆ.

Massoi Bark—Description of Three Kinds.—E. M. Holmes describes three different specimens of massoi bark, which may possibly throw some light upon a product concerning which some confusion still exists in commerce. These specimens were received from the Haarlem Museum, and, as identified by Dr. F. Hekmeyer, are the products respectively of *Cinnamomum xanthoneuron*, Bl., *Cinnamomum Kiamis*, Nees, and *Sassafras Goesianum*, T. and B. The first of these barks,

Cinnamomum xanthoneuron, Bl., occurs in pieces about 3 to 4 lines thick, with a thin, uneven, outer dark layer, which is seen under a lens to be composed of stratified cells; the layer beneath this is granular, the white sclerenchymatous bundles being irregularly arranged in a direction parallel to the surface, except near the inner surface, where they form two nearly regular lines. The portion next the inner surface is darker in color, forming rather more than one-third of the thickness of the whole bark, and shows numerous thin medullary rays. It is this portion of the bark that appears to be most oily and aromatic. The odor, when observed at a distance, resembles that of cocoanut milk. The taste is pungent, the flavor somewhat resembling the odor, but also recalling that of a mixture of cinnamon and rue. The second bark,

Cinnamomum Kiamis, Nees, is in quills like cinnamon, but as thick as cassia, somewhat wrinkled externally, extremely hard and woody, and is almost horny in consistence. It has very little odor, but a pungent taste, and a slight flavor between that of cinnamon and cassia. The inner surface is finely striated, and the transverse fracture is dark internally and paler towards the outer surface. The third of these barks,

Sassafras Goesianum, T. and B., is thinner than the first, but resembles it in odor. The taste also is very similar, but more pungent and faintly bitter, causing a sensation of heat in the mouth for some time, and an augmented flow of saliva. The bark is, however, only half the thickness, barely attaining two lines. It is paler in color in transverse section, is marked externally with faint longitudinal cracks, and is more markedly striated internally. In transverse section it presents a short granular fracture, the sclerenchymatous bundles being arranged at right angles to the surface, but the middle layer, corresponding to that of *C. xanthoneuron*, in which these bundles are horizontally placed, is scarcely developed. *Cinnamomum xanthoneuron* and *Sassafras Goesianum* are both natives of New Guinea, and *C. Kiamis* of Java, Sumatra, and apparently also of Borneo. All of these barks are met with in the bazaars of Java, and are used in cases of colic and diarrhœa and in spasmodic affections. According to Teysmann and Binnendyk, *Sassafras Goesianum* yields the true massoi bark. This view is substantiated by the opinion of Mr. Holmes, based upon his study and the corroborative observation of others. But whether or no this be the massoi bark from New Guinea from which Messrs. Schimmel also have distilled an oil having an odor resembling that of nutmeg and cloves, cannot be ascertained in the absence of specimens for comparison, though their description points most likely to *Cortex Cu.ilabani Papuanus* of Martiny's Encyclopœdia, 1, p. 436.—Pharm. Jour. and Trans., Dec. 15, 1888, 465–466.

Massoi Bark—Further Notes.—E. M. Holmes, since communicating his above paper, had his attention drawn to the fact that in the Kew

Garden's Report for 1880, an aromatic bark is described under the name of massoi bark, as being derived from

Massoia aromatica, Beccari.—From the evidence before Mr. Holmes it is evident that Dr. Beccari, when naming the bark, in the belief that he had a plant distinct from *cinnamomum* or *sassafras* before him, really had immature or imperfect fruits and bark under examination. A microscopic examination made by W. Kirkby for the author, proves the identity of this bark with that of *Cinnamomum xanthoneuron*, from the Haarlem Museum. The bark supposed by Messrs. Schimmel & Co. to be massoi bark, has since been examined by Mr. Holmes, and agrees fairly well with *Cortex Culilabani Papuanus*, as had been inferred by the previously received imperfect description.—Pharm. Jour. and Trans., March 23, 1889, 761.

MYRISTICACEÆ.

Ucuhuba-Fat—Chemical Examination.—E. Valenta has subjected the yellow-brown, peculiarly aromatic fat, introduced into commerce under the name of "ucuhuba-fat," and derived according to Tschiret from the seeds of *Myristica surinamensis*, or, according to Schädler, from *M. Becuhiba*, to chemical examination. It contains 93.4 per cent. of fatty acid, of which 8.8 per cent. is in the free state. The fatty acid mixture is composed of about 90 per cent. of myristic acid and about 10 per cent. of oleic acid. The fat contains also some resin and wax.—Arch. d. Pharm., February 1889, 184; from Z'schr. f. angew. Chem., 1889, 3.

POLYGONACEÆ.

Rhubarb—Insufficiency of the Ash-determination to Characterize Different Sorts.—The statement of Boni that the European varieties of rhubarb root may be distinguished from the Chinese sorts by their low ash percentage, has induced A. Kremel to make a series of experiments with samples of different rhubarbs. He finds that the amount of ash in the different sorts of rhubarb fluctuates too greatly to be of any practical value in the determination of the source, even the Chinese roots varying between 10 and 28 per cent. The amount of lime in the ash, which Boni had found to be very low in the case of the European varieties of rhubarb, offers no criterion.—Arch. d. Phar., April 1889, 320; from Phar. Post, 22, 105.

SCROPHULARIACEÆ.

Digitalis—Effect of Heat upon Its Preparations.—Roger stated at a recent meeting of the "Societé de Biologie," that the toxicity of digitalis diminishes very notably when the product of maceration is concentrated by the water-bath. Thus, a 5 per cent. maceration, which is toxic in doses of 2 cgm., no longer kills save in doses of 1.8 gm., when it is concentrated by 4 per cent. If reduced by 6.6 per cent., 3 gm. would be required to

produce the same toxic effect.—Amer. Jour. Pharm., April 1889, 174; from Nouv. Rem., Feb. 24, 1889.

Digitalis ambigua—Constituents.—Digitalis ambigua, which in some countries is more common than D. purpurea, contains according to Paschkis, the same constituents found in D. purpurea. Following the method of Schmiedeberg he obtained digitonin, digitonein, digitogenin, digitalin, digitalein and digitoxin. In an aqueous extract, chrysophanic acid was detected. The medicinal properties of the two drugs are identical.—Apoth. Ztg., 1888, 869.

SOLANACEÆ

Capsicum.—Yield, etc., of *Capsaicin,* which see under "Organic Chemistry."

Cayenne Pepper—Seat of the Pungent Constituent.—A. Meyer has proven by his recent investigations that the pungent constituent of capsicum—capsaicin—is not contained uniformly throughout all parts of the fruit, but exclusively in the placenta. Neither the walls of the fruit, nor the seeds, contain capsaicin, but these may acquire the peculiar pungency of the latter by coming in contact with the light-yellow, oily substance pervading the placenta in form of minute drops.—Arch. d. Pharm., April 1889, 318; from Pharm. Ztg., 34, 130.

Belladonna—Hyoscyamine the Primary Constituent—Atropine the Product of Decomposition.—The observation of E. Schmidt that hyoscyamine is convertible under certain conditions into atropine, and, that, consequently, there must exist a certain intimate relation between the two alkaloids, has led the "Chemische Fabrik auf Aktien" (formerly E. Schering), to undertake experiments, the results of which led to the announcement that neither belladonna root nor hyoscyamus seeds contain *atropine* ready-formed, but instead of this only *hyoscyamine,* the latter being converted wholly or in part into atropine during the process of extraction. At the instance of this establishment, Prof. Will has reviewed the whole subject, and finds the statement to be correct in every particular. The hyoscyamine supplied him was perfectly pure, and he prepared from it well crystallized salts, such as have hitherto not been obtainable from hyoscyamine. The conversion of the latter into atropine is easily accomplished, and results when hyoscyamine is heated for several hours in a partial vacuum at 109°–110°, the product being very nearly that quantitatively to be expected. The observation is highly interesting, since it throws new light, not alone upon the difficulties that have hitherto attended the isolation and identification of these particular alkaloids, but it also points out the possible reason for the variation in the alkaloids obtained from other substances, since these, as in the case of the solanea-alkaloid, possibly also undergo change during the process of their extrac-

tion and preparation.—Arch. d. Pharm., Aug. 1888, 698–699; from Pharm., 34, No. 45 et. seq.

OLEACEÆ.

Manna—Determination of Mannit.—A. Kremel recommends the following simple method for the determination of mannit in manna, in lieu of the more circumstantial process of the "Pharm. Germ.": One p. manna is dissolved in an equal part of water on the water bath, ten times as much (twenty p. ? Rep.) of 95 per cent. alcohol is added, the mixture heated to boiling, filtered through a tuft of absorbent cotton, and the alcoholic solution evaporated. Pure mannit remains as residue.—Arch. de Phar., Oct. 1888, 898; from Phar. Post, 21, 454.

LABIATÆ.

Pycnanthemum linifolium, Pursh.—*Uses, Preparation, etc.*—Howard T. Painter found the fresh herb to lose on drying from 50 to 60 per cent. of weight, and the air-dry herb to yield 6 to 7 per cent. of ash. The herb is known in some localities as *dysentery weed*, and is used for dyspepsia and in bowel complaints, and in hot infusion as a diaphoretic. The author proposes a *fluid extract* and from this a *syrup*, which see under "Pharmacy."—Amer. Jour. Pharm., Dec. 1888, 610.

Lycopus virginicus, Lin.—*Proximate Examination.*—Sherman F. Hennessy experimented with air-dry bugle weed, containing 9 per cent. of moisture. Cold water dissolved 10.4 per cent. of constituents, consisting of albuminoids, gummy matter, a little tannin, and extractive. Alcohol now took up 12.8 per cent. of chlorophyll, resin, bitter extractive, etc. A small quantity of a lemon-yellow volatile oil was obtained by distilling the herb with water.—Amer. Jour. Pharm., Feb. 1889, 70.

BORAGINACEÆ.

Eriodictyon californicum, Bentham.—*Proximate Examination of the Leaves.*—An analysis of the leaves yielded to Oliver F. Lenhardt, 7.6 per cent. of moisture, and 4.25 per cent. (or for the anhydrous drug 5.14 per cent.) of ash. Of the latter 26.66 per cent. was soluble in HCl, and 3.5 per cent. soluble in solution of KHO. Petroleum benzin extracted, including volatile oil, 2.63 per cent., of which .39 was wax, which separated from hot alcohol amorphous and melted at 61° C. With ether 15.3 per cent. of extract was obtained, of which three-fifths (9 per cent.) was a brittle, fragrant, slightly acid resin soluble in 80 per cent. alcohol; a little tannin was also present, and the green tenacious residue was partly soluble in benzol, and entirely soluble in carbon disulphide, and in chloroform; alkaloids and glucosides were absent. The exhausted leaves yielded to absolute alcohol 3.64 per cent. of extract, fully one-third of which was soluble in water, among other constituents tannin and a glucosidal com-

pound being dissolved. The watery extract of the exhausted leaves weighed 22.3 per cent., was of a brown color, had a pleasantly sweetish and somewhat acrid taste, and contained tannin.—Amer. Jour. Phar., Feb. 1889, 70.

CONVOLVULACEÆ.

Jalap—Apparatus Suitable for Extraction.—See *Continuous Percolator*, under "Pharmacy."

Pharbitis triloba—A Substitute for Jalap.—M. K. Hyrono discusses the value of the seeds of *Pharbitis triloba*, a native of Japan, for medicinal purposes, particularly as a substitute for jalap. He gives a full botanical description of the plant, and in particular of the seeds, with reference to the chemical constituents of which he says:

To extract the active principle, 400 grams of the finely-powdered seeds were twice boiled in alcohol of 90 per cent., filtered, and the pure filtrate decomposed by acetate of lead. The liquid filtered from the lead precipitate, after removing the excess of lead by sulphuretted hydrogen, was evaporated in the water-bath, by which a resinous mass was obtained. This was kneaded in warm water in order to rid the resin from its soluble impurities; and it was further purified by again dissolving in alcohol and precipitating by water. The resin thus finally obtained in the water-bath weighed 27 grams. It was a brittle, friable substance; ether extracted from it 10.3 per cent. of almost pure oil. The portion remaining insoluble in ether gave all the reactions of convolvulin. The pure resin was easily soluble in alcohol, but insoluble in bisulphide of carbon or chloroform; after treatment with dilute hydrochloric acid it reduced alkaline copper solution. Like convolvulin, it exhibited the chemical properties of a glucoside, splitting up, under the action of mineral acids, into sugar and convolvulionic acid, $C_{13}H_{22}O_3$, which forms a crystallizable salt with barium, soluble with difficulty in water, but readily in alcohol.

The author concludes that the resin obtained from *Pharbitis triloba* may be used officinally in the place of resina jalapæ.—Pharm. Jour. and Trans., Oct. 6, 1888, 270.

BIGNONIACEÆ.

Catalpa bignonioides, Walt.—*Presence of a Bitter Glucoside in the Fruit and Bark.*—Edo Claassen has isolated from the fruit, as well as from the bark of the catalpa tree a crystallizable glucoside, for which he proposes the name "catalpin" (see under "Organic Chemistry"). The bitter principle seems to be identical as obtained from either source, but the fruit is the most abundant source. It is contained to a moderate extent in the pericarp, but the placenta contains it in the largest quantity, while the seeds are apparently devoid of it. The latter contain an abundance of a mild, greenish fixed oil.—Phar. Rundschau, July 1888, 155–157.

Sesamum—Cultivation in China.—According to a Consular Report, sesamum is best grown on high dry ground, and is most in danger from excess of moisture; it does not require watering, and dew alone is sufficient moisture to nourish it. In making beds, therefore, the centres should be higher than the sides, so as to allow the water to run off. In the first month of every year it is sown broadcast, not in lines, and whether thickly or sparsely is immaterial. In about ten days it puts forth shoots, in two months and a half it is fit for harvesting. At harvest time the latest seeds are not yet ripe, but the harvest cannot wait, or the other pods would fall off, and the seeds drop out on the ground. The plants, root and all, are carefully taken out of the ground, put on a cement floor, and threshed with a flail. There are two kinds, black and white. Sesamum does not require manure generally, but in the worst soil ashes and ox manure may be used. About 27 ounces sown to an acre yield about 550 lbs.—Phar. Jour. and Trans., Dec. 22, 1888, 492.

LOGANIACEÆ.

Demerara Pink Root—Determination of Identity, Physiological Action, etc.—The directors of the Royal Gardens, Kew, recently received from St. Vincent, West Indies, specimens of a plant which was represented "to be poisonous to cattle, sheep, and goats, and to prove fatal in two or three hours." This plant was identified by Professor Oliver as *Spigelia antheimia*, L., a member of the natural order Loganiaceæ, commonly distributed throughout the tropical parts of continental America and the West Indies. It is a glabrous annual, with two pairs of upper leaves so closely approximate that the plant somewhat resembles *Paris quadrifolia*. The flowers are small and tubular, of a white and pink color, arranged in a unilateral scorpoid raceme. The fruit when ripe is purple. This species is figured in Browne's "Jamaica," t. 37, f. 3; in Tussac's "Flora Antillarum," IV., t. 8, and in Descourtilz' "Flore Médicale des Antilles," I., t. 61. There is also a figure, a poor one, in the *Botanical Magazine*, t. 2,359. In the latter publication it is stated that *Spigelia anthelmia* is a plant of considerable efficacy for the cure of worms, and febrile diseases supposed to arise from the presence of worms. It was first brought into notice by Dr. Patrick Browne, in the "Natural History of Jamaica." . . . "There can be no doubt, this and the allied *S. marilandica* are very efficacious remedies; but whether from the unpleasant narcotic effects which they sometimes produce, especially on the eyes, or some other cause, they seem now to be very much neglected." In Bentley and Trimen's "Med. Plants," 180, it is stated that "the root and herb generally of *Spigelia anthelmia* is a popular remedy in British Guiana as an anthelmintic." Its effect is said to be even more certain and marked than that of the official pink root (*S. marilandica*). Lunan in "Hortus Jamaicensis," p. 306, describes *Spigelia anthelmia* as

"a powerful vermifuge, which administered incautiously has proved fatal."—Amer Drugg., Feb. 1889, 32; from Bull. of Kew Gard., 1888, 265.

Strychnos Ignatii—Alkaloidal Constituents of the Wood, etc.—Prof. F. A. Flückiger, after describing the pharmacognostic characters of an authentic specimen of the stem wood of *Strychnos Ignatii*, which correspond in all respects with those of "Lignum colubrinum," one of the "snake woods" of the above writer, gives the methods pursued for the determination of the alkaloidal constituents. It appears to contain 0.932 per cent. of alkaloid, composed mainly of brucine, but containing also some strychnine. The woody portion of the roots was also examined, but appears to contain less total alkaloid, mainly of strychnine, while the presence of brucine is somewhat doubtful. The leaves of Ignatia are devoid of bitterness, and therefore presumably also of alkaloid. The fruit-hulls contain no alkaloid whatever. The seeds examined by Bernhart Sundblom, yielded 0.178 per cent. strychnine and 0.278 per cent. brucine. They were examined also for *loganine*, discovered by Dunstan and Short in nux vomica, but this seems not to be present.—Arch. d. Phar., Feb. 1889, 145–158.

ASCLEPIADACEÆ.

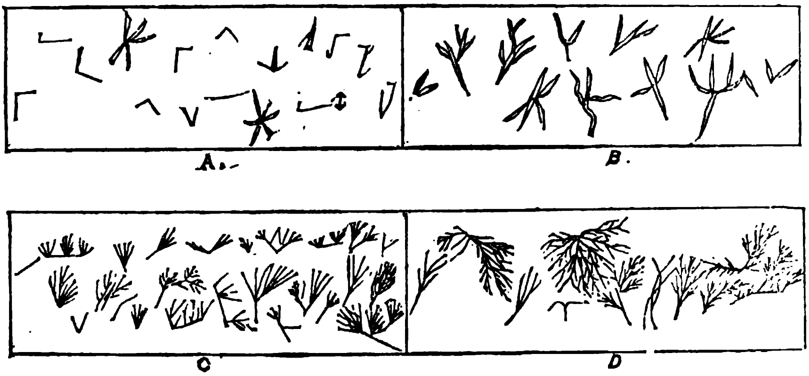
Asclepias Cornuti and A. tuberosa—Glucosidal Constituent and Proximate Examination.—Fred. B. Quackenbush records the results of a partial examination of *Asclepias tuberosa* and a more complete examination of *A. Cornuti*. The latter drug, after exhausting with all the solvents, was found to consist of 49.86 per cent. of cellulin and lignin.

The results of the analysis may be summed up as follows:

Petroleum ether extracted		1.44	
Ether extracted		1.30	
Absolute alcohol extracted		3.58	
			6.32
Water	Saccharose	3.29	
	Glucose	1.87	
	Mucilage	3.60	
	Undetermined compounds	3.22	
			11.98
Alkaline solution			3.91
Acid solution			4.36
Chlorine water			8.92
Moisture			7.16
Ash			5.35
Cellulin and Lignin			49.86
Loss			2.14
Total			100.00

In addition to the above, starch was also found, but was not estimated. This drug contains many of the usual plant constituents, also caoutchouc, and a crystalline glucoside having a slightly bitter taste, and also resembling the taste of the root. This principle is probably identical with the bitter principle observed by Walter L. Hinchman in the same drug in 1881 (see Proc. 1882, 178), and possibly also with that obtained from *A. tuberosa* by Elam Rhoads in 1861. From the latter drug Mr. Quackenbush also obtained a crystalline principle, but it is not very clear from his description that he considers this identical with the principle from *A. Cornuti.* The cuts accompanying the author's paper are here reproduced (see Fig. 26,) *A* and *B* showing the character of the principle for

FIG. 26.



Crystals from Asclepias Cornuti.

A. tuberosa, while *C* and *D* shows the crystals obtained from *A Cornuti.* The presence of tannin, announced by both Rhoads and Hinchman, could not be verified by the author.—Amer. Jour. Phar., March 1889, 113–116.

APOCYNACEÆ.

Apocynum cannabinum—Physiological Action.—Dmitry A. Sokoloff has made an experimental inquiry into the biological action of apocynum root, which, while officinal in the U. S. Pharm., is little known in the Old World. The chief outcome of the author's researches is condensed as follows:

(1) The drug produces a very pronounced retardation of the cardiac action, with a very considerable enlargement of the pulse wave and a marked rise of the blood tension.

(2) The initial retardation of the heart is followed by an acceleration of the cardiac action, while the arterial pressure ascends still further.

(3) The cardiac retardation (first stage) is caused by an irritating ac-

tion of the drug, both on the central and peripheral inhibitory apparatuses.

(4) The subsequent acceleration (second stage) is not dependent upon anything like paralysis of the inhibitory apparatuses, since the injection of another dose of the infusion can again give rise to a retardation of the heart's work.

(5) On the injection of a very large dose, the two stages are followed by a third one, which is characterized by cardiac arhythmia, the appearance of Traube's waves, and a gradual fall of the blood pressure down to 0.

(6) The rise of the blood tension during the first and second stages is dependent not only upon the stimulation of the vaso-motor centres in the medulla oblongata, but also (and that in a very considerable degree) upon the excitation of the spinal vaso-motor centres. Moreover, the heart and blood vessels themselves take a certain active part in the causation of the rise.

(7) Both the central and peripheral vaso-dilatory apparatuses remain wholly intact.—Med. Chronicle, Sept. 1888; from Ejened. Klin. Gaz., 1888, Nos. 25, 26.

Strophanthus—Presence and Isolation of a Non-nitrogenous Diuretic Substance.—Catillon, after having separated strophanthin from the seeds, isolated a non-toxic, nitrogenous principle which, tried first upon rabbits and then upon himself, he found to be the diuretic principle of the plant. To obtain it, the author, first exhausting the seeds with alcohol, treats them with distilled water, afterward adding milk of lime, and filtering. A current of carbonic acid is then passed through the filtered liquid, which combines with the excess of lime. The liquid is then evaporated to a syrup, again filtered, and then evaporated in vacuo. The product is soluble in water and in alcohol at 70°; less soluble in stronger alcohol. The product is a sort of strophantate of lime, which gives a precipitate with hydrochloric acid.—Amer. Jour. Pharm., March 1889, 131; from Soc. de Thérap., Dec., 26; Répert. de Phar., Jan. 10, 1889.

Strophanthus glaber, Gabon.—Presence in the seeds of a body identical with *Ouabaïn* (from *Acokanthera Ouabaio*), which see under "Organic Chemistry."

Ouabaïo—Source of the Somali Arrow Poison.—Arnaud states that the Somalis on the east coast of Africa prepare an arrow-poison from the aqueous extract of the wood, and especially the root of Ouabaïo, a tree which is closely related to, although not identical with

Carissa Schimperi, a native of Abyssinia. From a concentrated extract of the wood in warm water, the author obtained by a suitable method—briefly described—a crystalline substance, which he names

Ouabaïn.—This contains no nitrogen and has the composition $C_{30}H_{46}O_{12}$. It forms thin, white, nacreous lamellæ, with no taste, no

smell, and a neutral reaction. It is almost insoluble in cold water but is readily soluble in boiling water, with a great tendency to form supersaturated solutions, and also dissolves readily in moderately concentrated alcohol; but it is almost insoluble in absolute alcohol and insoluble in ether or chloroform. At 180°, it becomes pasty with slight decomposition, and at 200° it is completely melted. A warm aqueous solution has a rotatory power $[\alpha]_D = - 34°$. A concentrated aqueous solution gives a precipitate with tannin. When boiled with dilute acids, it yields a reducing sugar, and hence it would seem that ouabaïn is a glucoside. When ouabaïn crystallizes from an aqueous solution, it contains 7 mols. H_2O, which is not completely expelled below 130°. When boiled with barium hydroxide, ouabaïn yields a barium-derivative, which when dried at 100° has the composition $Ba (C_{30}H_{47}O_{12})_2$. Ouabaïn has no toxic effect when introduced into the stomach, but when introduced by subcutaneous or intravenous injection, it acts on the heart and produces death. 2 milligrams will kill a dog of 12 kilos. in a few minutes.

Condurango—Remedial Value.—Professor Oser, who has been making trials of condurango bark in carcinoma and other diseases of the stomach, finds that it has an excellent effect on the appetite, and that it relieves over-sensitiveness. Some patients can take it for months without any unpleasant symptoms, while in others it soon sets up nausea, which cannot be prevented either by the simultaneous administration of correctives or by the employment of different preparations of the bark, such as the vinum or the liquor. Condurango appears to Professor Oser to deserve a place in our materia medica as a symptomatic remedy; but as to its exerting any specific action on malignant disease, he still holds to his own dictum that the only hope of cure in cancer of the stomach by means of drugs lies in the possibility of a mistaken diagnosis.—Amer. Jour. Phar., Sept., 1888, 474; from Jour. Am. Med. Assoc.

SAPOTACEÆ.

Gutta-Percha—Search for New Sources.—The rapid destruction of the true gutta-percha trees (*Isonandra Gutta*) has led to the search for other sources—*Mimusops Schimperi*, *M. Kummel*, and a number of undetermined species of *Payena* having been prominently proposed. Heckel and Schlagdenhauffen, however, find that the products of the milky exudations of the two *Mimusops* cannot be utilized by themselves, but must be mixed with genuine gutta-percha before they can be used industrially. The subsance yielded by the *Payenas* also corresponds more nearly to caoutchouc than to gutta-percha, both in its elementary composition and in its chemical properties. Under these circumstances it seems necessary that attention should be paid mainly to the cultivation of *Isonandra Gutta.*—Arch. d. Pharm., Nov. 1888, 1043; from Jour. de Pharm. et de Chim., 1888, xviii, 245.

EBENACEÆ.

Diospyros virginiana, Lin.—*Proximate Examination of the Bark.*—The bark of this tree is of a tan color, and has a mucilaginous bitterish, then sweetish and astringent taste. Experiments made by Frank E. Murphy gave the following results: The powdered bark yielded to petroleum benzin 0.9 per cent. of an amber-colored extract, free from volatile oil. Ether took up 1.4 per cent., the extract yielding to alcohol a wine-colored mass, which deposited from chloroform in stellate or granular crystals. The alcohol extract of the bark amounted to 2.5 per cent. and was partly soluble in water. The water extract weighed 12 per cent., and contained mucilage and dextrin. The extracts thus far obtained yielded a purple color with alkalies, the reaction being due to yellow coloring matter. On treating the exhausted bark with weak solution of soda, the mixture also acquired a deep purple color, and ultimately became gelatinous. The acid infusion of the residuary bark gave with ammonia a purple colored precipitate; calcium oxalate was not found.—Amer. Jour. Pharm., Feb. 1889, 69.

STYRACEÆ.

Benzoin—Assay of Commercial Samples.—Thos. F. Moody assayed ten commercial samples of benzoin, by digesting and afterward boiling in each case 20 grams with 10 gm. of slaked lime and 200 gm. of distilled water; the decoction was filtered, the residue well washed with hot water, the filtrate cooled and acidulated with hydrochloric acid. The precipitate was collected on a filter, washed with cold water, the filtrate agitated with chloroform, the chloroform solution evaporated, and the residue added to the contents on the filter. After drying, the benzoic acid thus obtained was weighed, amounting for the samples examined to 2.14, 3.20, 3.40, 3.55, 4.0, 5.02, 5.50, 9.05, 9.72, and 10.45 per cent. In each case the presence of cinnamic acid was shown by the bitter almond odor produced on treatment with potassium permanganate. The author also states that he observed the white tears to yield a much smaller amount of benzoic acid than the brown mass, but analytical figures are not given.—Amer. Jour. Phar., Dec., 1888, 606.

ERICACEÆ.

Ericaceous Plants—Occurrence and Absence of Andromedotoxin.—Dr. P. C. Plugge has examined a large number of ericaceous plants in addition to those previously examined, with a view to determine the presence or absence of andromedotoxin. He finds this poisonous principle to be *present in:*

Andromeda japonica, Thunb.; *A. polifolia*, L.; *A. Catesbæi*, Walt.; *A. calyculata*, L.; *A. polifolia angustifolia; Rhododendron ponticum*, L.; *Rh. chrysanthum*, L.; *Rh. hybridum; Rh. maximum*, L.; *Azaleo indica*, L.; *Kalmia latifolia*, L.

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Andromedotoxin is *absent in:*

Rhododendron hirsutum, L.; *Ledum palustre*, L.; *Clethra arborea; Clethra alnifolia; Arctostaphylos officinalis* (*Uva Ursi*), Wimm.; *Chimaphila umbellata*, Nuttall; *Oxydendron arboreum; Gaultheria procumbens*, L.—Arch. d. Pharm., Feb. 1889, 164–172.

Wintergreen Leaves—Constituents.—Prof. Frederick B. Power and Norbert C. Werbke have determined some of the constituents of wintergreen leaves, and subjected the volatile oil to chemical examination. The

Volatile Oil of Wintergreen, which is generally regarded to be identical with the volatile oil of sweet birch, differs from the latter in several particulars. The authors confirm the presence of the constituents named by Cahours *gaultherilen* in oil of wintergreen, but finds this to be entirely absent in oil of sweet birch, which is composed of methyl-salicylate exclusively. On this account the sp. gr. of the latter oil is always somewhat higher than that of true wintergreen oil, that found for birch oil being 1.1819, while wintergreen oil has the s. g. 1.1759. The boiling point of the two oils is nearly identical. With regard to the amount of gaultherilen in wintergreen oil, the authors find this to be much smaller than was originally given by Cahours (10%), the quantity obtained being 0.31% only, and corresponding to that obtained by Pettigrew (see Proceedings 1884, 257–258). In view of the otherwise close similarity of the two oils, the fact that true oil of wintergreen is produced in very limited amount only, and that they consist essentially of methyl salicylate, the authors suggest that it be designated in future revisions of the Pharmacopœia as "methyl salicylate," and to recognize as the same medicinal agent either the volatile oils of *Gaultheria procumbens* and *Betula lenta*, or the pure synthetical product which is now extensively produced.

As to the other constituents of wintergreen leaves, the authors found *gum*, *coloring matter*, *tannin*, *sugar*, and two substances resembling *quercitrin* and *arbutin*, respectively. In view of the isolation of *andromedotoxin* by Professor Plugge from the leaves of various ericaceous plants, the authors searched for this principle, but conclude from their experiments that this poisonous principle is not a constituent of wintergreen leaves. They also failed to satisfactorily isolate ericolin (isolated by Thal from *Ledum palustre* and other ericaceous plants—See Proceedings 1884, 146 and 147).—Pharm. Era, Jan. 1889, 15–17: from Pharm. Rundschau, Sept. 1888, 208–211.

CISTACEÆ.

Helianthemum canadense—Proximate Examination.—William Crutcher examined *Helianthemum canadense*. Petroleum benzin extracted 1.15 per cent., containing a little volatile oil, wax and saponifiable fat. Ether dissolved 1.4 per cent., wax, chlorophyll, etc. Alcohol took up 23.05 per cent., nine-tenths of which was soluble in water; the tannin was esti-

mated by precipitating with lead acetate and cupric acetate, the results of both experiments indicating 10.8 per cent. of tannin. Water dissolved from the powder 7 per cent. mucilage, sugar, etc.; and dilute soda solution took up a little over 4 per cent. of pectin and albuminoids. The presence of starch was determined, but its amount not estimated. The air-dry powder contained 7 per cent. of moisture and 3 per cent. of ash. Indications of a glucoside having been obtained, the alcoholic extract was treated with water and the solution agitated with benzol; on evaporating this liquid fine needles were left, but not further examined.—Amer. Jour. Pharm., Aug. 1888, 390.

COMPOSITÆ.

Anthemis nobilis—Proximate Examination of the Flowers.—On exhausting the flower-heads of Anthemis nobilis with petroleum benzin, Ella Amerman obtained a green wax, which after six recrystallizations from alcohol was nearly white, bitter and crystalline, and melted at about 130°C. On exhausting the drug now with ether, and treating this extract again with ether, as recommended by Camboulises in 1871, a crystalline substance, distinctly acid, and of a glucosidal nature, was obtained. A small quantity of similar crystals was also obtained by Werner's process (1867), by exhausting with dilute acetic acid, concentrating, precipitating with alcohol, treating with chloroform, evaporating, exhausting with ether, and treating this extract with warm distilled water. In a third experiment the alcoholic tincture of the flowers was concentrated, precipitated by water, the filtrate treated with chloroform, the solvent evaporated, and the residue treated with water. The aqueous solution of the crystals, on being boiled with hydrochloric acid, became opalescent, emitted a honey-like odor, and with Fehling's solution now gave evidence of the presence of glucose. There was no evidence of the presence of an alkaloid.—Amer. Jour. Pharm., Feb. 1889, 69.

Lactucarium—Examination.—Kremel has found in various specimens of lactucarium an adulteration with bread crumbs. Lactucarium extracted with a mixture of 3 parts alcohol and one part chloroform should yield from 55 to 60 per cent. extract (chiefly lactucon). The percentage of moisture and ash is also affected by an addition of bread crumbs. No. 1 was a pure specimen; 2 and 3 were adulterated, starch could be detected in these by the microscope as well as the iodine test in an aqueous decoction.

	Moisture.	Ash.	Chloroform-Alcohol Extract.
1	5.80 per cent.	6.50 per cent.	57.46 per cent
2	5.88 "	4.51 "	40.00 "
3	10.84 "	1.61 "	11.54 "

—Pharm. Centralhalle, 1888, 512.

Insect Flowers—Structural Characteristics.—Prof. Jos. Schrenck points out certain differences which may be useful in determining the origin and purity of commercial insect powders. The stem of the Dalmatian plant (*Chrysanthemum cinerariæfolium*) consists in the ridges of collenchyma tissue, which is also found in the depressions in the Persian plant (*Chrys. roseum*); but in a good insect powder, fragments composed of collenchyma cells should be met with only sparingly. Fragments of the involucral scales, composed of sclerenchyma cells, are much more numerous in the Persian than in the Dalmatian powder. The outer surface and edges of the scales of the Dalmatian flowers contain numerous hairs, consisting of a long cell with attenuated ends placed horizontally upon a one to three-celled stalk. The Persian flowers are almost entirely glabrous, a white hoariness being found only at and near the base of the scales, and very few hairs near the apex; the hairs are of the same structure as the preceding, only the terminal cell being much longer. These hairs are entirely absent from the involucre and stem of the so-called Hungarian or Russian daisy; but the scales contain hairs consisting of from four to ten cells and terminating with a much elongated, thin-walled, or with an inflated cell. Another form of glandular trichome consists of ten or twelve cells, forming a globular head supported on a short stalk. The author also directs attention to the presence in the powder of conspicuous fragments consisting of papillæ, covering the upper epidermis of the marginal corolla. The petals of other related species are similarly constructed. The pollen grains of the species mentioned are likewise similar in structure. Mœller (*Mikroskopie*, etc., 1886) stated that the petals contain no stomata; but the author found stomata quite numerous on the marginal corolla of *Chrys. cinerariæfolium*, especially on the lower side.—Amer. Drugg., March 1889, 42–43.

Insect Powder—Distinction of Dalmatian from the Persian Powder.—John Kirkby contributed an interesting paper on "Insect Powder," to the British Pharmaceutical Conference. With a view to the detection of the introduction of foreign substances into insect powder, the author has submitted the flower heads of authentic specimens of *Chrysanthemum cinerariæfolium*, the reputed source of Dalmatian insect powder, to a microscopical examination, with a view to the detection of histological elements characteristic of the species. These he believes he has found in the pollen grains and the epidermal papillæ of the ligulate florets, cuts of which are shown in the author's original paper. The papillæ differ somewhat even from those of the ligulate florets of *C. roseum*, the source of Persian insect powder, and could be used as a means of detecting that admixture. —Yearbook of Phar., 1888, 376–382.

Insect Powder—Examination of Commercial Samples.—J. Hart has examined commercial samples of insect powder. The powders varied very much in color, and may be described as yellow, yellowish-brown,

brownish-yellow, and the cheap powder, yellowish-green; the ash from the flowers varied from 5.4 to 6.1 per cent., and that from the powders from 6.1 to 6.4 per cent. (both closed and open flowers and powders were used, but chemically no difference was traced). The ash from peduncles and receptacles only (to the exclusion of the florets) showed 5.6 per cent. These figures agree, so far as the powders are concerned, with Howie's (he gives ash as 6.2), the difference in the ash from the flowers being evidently due to the different proportions of silica that had been retained, either during the growth or collection, and which, during the necessary manipulations of the flowers, must vary very much more than it could do in the powder. This was evident from the varying proportion of sand found in the ash, but it may be safely asserted that the ash from a genuine sample ought scarcely, if at all, to exceed 6.5 per cent.

The iron was also fairly constant and estimated as Fe_2O_3; the flowers gave 1.2 per cent. to the powder 1 per cent. Howie's remark that yellow ochre was doubtless used to cover other adulterants led to this estimation. Having thus got a very fair idea of what is the structure and composition of the genuine article, he turned his attention to the cheap sample. As before stated it was of a yellowish-green color, and in very much finer powder than any he had seen before. Viewed under the microscope this was confirmed, while the large amount of long cells, and the almost total absence of pollen showed, at all events, that the flowers did not predominate (some slides were destitute of pollen altogether). Granules were also noticed similar to starch, and on running in an aqueous solution of iodine these granules assumed the purple-blue color so characteristic of that carbo hydrate. This was present in such large quantities that when looked at afterward the slide seemed one black mass. After examining a number of slides and noting the starch present in each, he came to the conclusion that not less than from 20 to 25 per cent. was present; the size of the granules varied from .0005 to .0015 inch. The nucleus and concentric rings were scarcely visible, and viewed with polarized light they gave the characteristic cross of wheat starch.

On estimating the ash it was found to yield 16.2 per cent., instead of 6.5; this effervesced very strongly on the addition of HCl; it yielded an insoluble residue equal to 5 per cent. of the powder; the iron, estimated as Fe_2O_3, instead of 1 per cent. was 5.3, and deducting the Fe_2O_3 due to the plant, and estimating the remainder as Fe_26HO, the yield was equal to 6.3 per cent. of the powder. This was evidently colored with yellow ochre or limonite of iron, Fe_26HO. Various samples of limonite were then examined, but they varied very considerably; the highest yield of Fe_26HO was 63.2 per cent. and the lowest 25.54.

In the light of these results it is readily conceivable how such rubbish as this can be sold under the name of insect powder at a very low price, and still realize a profit very much greater than that obtained from the

sale of the genuine article. This sample was evidently ground from the entire plant, and contained at least 25 per cent. of starch and 12 per cent. of yellow ochre.—Pharm. Rec., Oct. 1, 1888, 215–216: from Brit. and Colonial Drugg.

Insect Powder—Sophistication of the Dalmatian Powder by the Hungarian Daisy.—G. M. Beringer calls attention to a consignment to New York of Hungarian daisies, evidently intended and used as a sophistication of Dalmatian insect powder. The similarity in size and general appearance to the flowers of the latter, are calculated to deceive the unguarded or careless observer. The botanical characteristics of the Hungarian daisy indicate that it most probably belongs to the sub-genus *Leucanthemum*. Mr. Beringer gives a comprehensive description of these flowers, accompanied by illustrations showing the distinction between the Dalmatian and Hungarian drug. The Hungarian daisy is distinguished from the true Pyrethrum by the orange-yellow disk florets, by the depression of the involucre, by its prominent dark receptacle and the absence of pubescence and pappus. The odor is less pungent than that of the true insect flower, being more like that of matricaria. The difference in odor is more pronounced on infusing in warm water. The Hungarian daisy yields a powder, somewhat darker in color. This powder used upon flies and cockroaches appeared to have no value as an insecticide. Microscopically no difference could be detected between the two powders.

Time and the amount of material at command would not permit of a thorough chemical examination, but it was hoped that the percentage of extractive matter obtained with various solvents might furnish a useful comparison. The following statement exhibits the results obtained.

	Chrysanthemum cinerariæfolium.	Hungarian Daisy.
Petroleum ether	2.49 per cent.	3.37 per cent.
Ether	2.85 "	2.68 "
Alcohol	6.57 "	9.45 "
Water	16.70 "	13.43 "
Ash	6.50 "	9.30 "

—Amer. Jour. Pharm., Jan. 1889, 1–4.

Insect Powder—Detection of Curcuma.—According to C. Schwarz and E. Ritsert, the presence of curcuma in insect powder is determined by making an alcoholic tincture, concentrating on a water-bath and impregnating strips of filter paper with the residue. These strips with boric acid give an orange-red color, on addition of NaOH turning green. Insect powder, composed of the flowers only, should give an ash of a decided green color, due to the presence of manganese compounds; the stems are almost free from manganese. Barium chromate has been used to impart color to the insect powder.—Am. Jour. Pharm., Jan. 1889, 22; from Pharm. Ztg., 1888, 692–715.

Grindelia robusta—Anatomical Structure.—Joseph Beauvais gives the

following description of the anatomical structure of *Grindelia robusta:* Both sides of the leaves have the epidermis covered with a thick cuticular layer, and contain glands and stomata. The glands consist of a one-celled base bearing the gland-cell, which is filled with resin. Beneath the epidermis of both the upper and lower surface is found a layer of parallel palisade cells containing chlorophyll; the central part of the mesophyll consists of spongy parenchyma, in which the vascular bundles are imbedded. These bundles are closed, collateral, and are surrounded by a sheath of thick-walled collenchyma, gradually passing into the hypoderma of the upper and lower surface of the leaf. Rather large resin-ducts are put within this collenchyma layer. The involucre of the flower-head consists of spirally arranged scales. A transverse section through the top portion of these scales is nearly circular, and is covered with an epidermis, bearing glands and stomata upon the outer surface, and covering several tiers of palisade cells, both on the outer and inner surface. A vascular bundle in the centre of the scale is surrounded by a layer of collenchyma containing resin-ducts. The transverse section through the middle of the involucral scale is elongated in shape, and is divided into an upper and a lower part by a rather broad zone of sclerenchyma. In the upper part beneath the epidermis is a palisade layer extending to the edges; but the lower part has no palisade cells, but contains elongated, thick-walled cells, forming large intercellular spaces. Near the base of the involucral scale the edges are free from palisade cells, but contain collenchyma. The florets are small, and collected into many-flowered heads; those of the outer row are unisexual and ligulate, while the disc florets are tubular. The latter are on both sides covered with a cuticized epidermis, and contain a slightly developed mesophyll with compressed cells, which, however, are wanting in some parts of the corolla. The ligulate florets have a well-developed mesophyll consisting of thin-walled cells, and containing yellow oil in the intercellular spaces. Papillæ are formed on both sides of the epidermis. Anthers, gynæcium and the seed show no striking characteristics. The receptacle has rather long appendages (Zotten) which differ from those of most compositæ in not containing vascular bundles. —Amer. Jour. Pharm., Feb. 1889, 82–85; from Ber. d. D. Bot. Ges., 1888, 403.

Grindelia robusta and Grindelia squarrosa—Proximate Examination. —After briefly reviewing the characters and properties of these drugs as found in the market, and giving a short history of previous investigations, William Henry Clark communicates the details of a proximate examination made by him, the results of which are given in the following tabulated statement:

			G. robusta.		*G. squarrosa.*	
Petroleum ether extract:	Wax	0.41	8.87%		0.36	5.94%
	Fixed oil	8.27			5.42	
	Vol. oil	0.17			0.16	
Ether extract	Resin	3.80	4.02%		4.01	6.92%
	Other substances	0.22			2.91	
Alcoholic extract			2.04%			2.67%
Water extract:	*a.* Mucilage and carbohydrate precip. by alcohol	2.17	12.16%		1.93	12.88%
	b. Glucose	1.26			1.90	
	c. Ash (0.5 from a)	2.80		(0.67 from *a.*)	2.51	
	d. Other substances	5.93			6.54	
Dil. caustic soda:	Pectin, albuminoids	5.68%				3.56%
Dil. Hydrochlor. ac.:	Calcium oxalate	1.06	2.17%		1.00	4.94%
	Oher substances	1.11			3.94	
Intercellular substances:			30.24%			25.44%
Sand, cellulose, etc:			12.53%			15.02%
Moisture			11.12%			11.7%
Ash			7.77%			5.22%

Though carefully searching in *Grindelia robusta* for the alkaloid previously described by Dr. Rademaker (in Proceedings, 1888), the author was unable to confirm its presence. A neutral principle and an acid appear to be present in small quantities.—Amer. Jour. Pharm., Sept. 1888, 433-441.

Senecio canicida—Physiological Action, etc.—Debierre calls attention to this plant, which, in Mexico, as is indicated by its name, is used for poisoning dogs, but is also used medicinally as a diaphoretic, and in the treatment of throat and skin diseases. Gouillouet has determined that the poisonous principle is contained in smaller quantities in the leaves and in larger quantities in the roots of the plant. Its poisonous action, which is not confined to dogs, is characterized by three stages: the first, excitement; the second, palliative; the third, and final, convulsions. In all cases there is an increase in temperature, which manifests itself until death. The poison is more energetic when injected subcutaneously than when given by the mouth.—Arch. d. Phar., Feb. 1889, 130; from Nouveaux Rem., 1888, 8, 6.

Semen Cardui Mariæ—Remedial Value.—Dr. A. Tripier claims to have had remarkable success with this drug in the treatment of abdominal varix, hemorrhoids, certain cases of urethral and uterine engorgement, and other forms dependent upon conditions of local congestion with painful tension. The treatment was adopted from indications given by Rademacher, followed by Worms, who used a decoction made from the seeds. Tripier uses a tincture (made from the seeds), in doses of 20 drops in a tumbler of water, night and morning.—Amer. Jour. Pharm., Oct. 1888, 511; from Bull. Gén. de Thérap., June 15, 1888.

Hysterionica Baylahuen—Remedial Value.— Prof. Dujardin-Beaumetz received samples of this plant from Chili, where it is thought to have special action in certain gastro intestinal troubles (especially in chronic, hemorrhagic recto-colitis), indigestion, flatulent dyspepsia, etc. He gave the samples to Dr. Baillé, who gives the results of his studies in the "Bull. Gén. de Thérap., (Feb. 23, 1889): A close analogy was found to exist between this plant and *Grindelia robusta*, though Dr. B. writes that he has not been able to find the substance (analogous to saponin), cited by Mr. Henry Clark in his paper on *Grindelia robusta* (which see), and called by him grindelin. Dr. B. made a tincture of hysterionica by macerating 100 gm. of the plant in 500 gm. of strong alcohol for 10 days; dose 15 to 35 drops. Doses of 20 drops appear to have given excellent results in two cases of chronic bronchitis. The action seems to be similar to that of other balsamics, but it is better tolerated. Its action was excellent in obstinate diarrhœas, which had not been benefited under opium and sub nitrate of bismuth; also in the late and persistent diarrhœa of phthisical subjects. Dr. B. thinks it acts as "a kind of antiseptic dressing upon the intestinal surfaces." It exerted a notable amelioration in two cases of cystitis. It also gave good results as a dressing for open wounds, and in two cases of varicose ulcer. The author favors the use of an infusion of 1 part of the plant in 150 parts of water. —Amer. Jour. Phar., April, 1889, 173.

DIPSACEÆ.

Cephalaria syriaca, (*Scabiosa syriaca*, L.)— *Occurrence of the Seeds in Admixture with Egyptian Grain.*—Ballaud states that the seeds of *Cephalaria syriaca* are frequently found in considerable quantities (up to 2 per cent.) in admixture with Egyptian grain. The flour produced from such grain has a peculiar bitter taste, and bread baked from it a dark color. These seeds are about 5 to 7 m.m. long, columnar, smaller below than above, eight sided, and have a dull appearance. When pressed between paper they produce a permanent fatty stain.—Arch. d. Pharm., Oct. 1888, 900–901; from Jour. de Pharm. et de Chim., 1888, xviii. 156.

RUBIACEÆ.

Cinchona—Cultivation in Java.—Van Romunde reports that the output of the Dutch cinchona plantations, for the year 1887, amounts to 703,313 half kilograms of bark. The crop of 1888, on the other hand, is, in consequence of the slow development of the plants during the first months of the year, quite small, amounting only to about 75,000 half kilograms.—Arch. d. Pharm., Oct. 1888, 902; from Niew. Tijdschr. Pharm. Nederl., 1888, 283.

Cinchona — A Cancerous Disease Affecting the Cultivated Plants in Java.—Dr. O. Warburg describes the nature of the disease known as

cancer, which attacks the cinchona plantations of Java. There are two kinds of cancer, one infecting the root, the other the stem. The former is found beneath the bark, immediately below the ground, in the form of a white flocculent fungus myælium, from whence it extends to both stem and root, causing cracking of the bark. The fungus appears to be a rhirzomorph, very similar to that of *Agaricus melleus*. The cancer of the stem makes its appearance higher up in the trunk and branches. It is caused by a parasitic fungus, propagated by means of spores, resembling that which causes the cancer of the bark. The diseased trees are also found to be attacked by *Peziza Wilkonnaii*, but it is not evident that this fungus is the cause of the disease. The only efficacious remedy suggested by the author is to cut out the diseased parts; also to choose those varieties which seem least liable to the disease. He states that *Cinchona succirubra* shows itself in this respect a more desirable variety than *C. Ledgeriana*.—Pharm. Jour. and Trans., Dec. 29, 1888, 514.

Cinchonas—Hybridization.—An important contribution to the knowledge of the conditions affecting the cultivation of cinchona is given by David Hooper: In the cinchona plantations of the Madras government there are two well defined species of *Cinchona—C. succirubra* and *C. officinalis*—the bark from the former containing less quinine, with more cinchonidine and cinchonine, than that from the latter. Between these two species there are also many hybrids, and as the hybrids frequently assume the quicker growing character of the succirubra parent, it was interesting to ascertain how far and in what direction the hybridization affected the production of alkaloid. Fifty samples of succirubra bark examined yielded an average of 6.5 per cent. of total alkaloid, and in 100 parts of this the quinine ranged from 17.6 to 26.8 parts, the average being 22.2 parts, whilst the average of the cinchonidine was 36.1 parts. Only five out of the fifty samples failed to comply with the requirements of the British Pharmacopœia for an official bark, that it should yield between 5 and 6 per cent. of total alkaloid, not less than half of which shall consist of quinine and cinchonidine. From fifty samples of *C. officinalis* bark the average yield of total alkaloid was 5.25 per cent., but in 100 parts of this the quinine ranged from 48.2 to 62.1 parts, average 55.9 parts, while the cinchonidine only averaged 26.7 parts. The results obtained in analyses of twenty-five hybrid barks show more total alkaloid, with proportions somewhat different from the theoretical quantities calculated for a typical hybrid on the assumption that it would partake equally of the character of the two parents. The quinine ranged from 30.8 to 55.3 per cent. of the total alkaloid, the figures for cinchonidine increasing more or less with the decrease of the quinine, and the two together constituting four-fifths of the whole alkaloid. The highest amount of quinine in the succirubra barks was only equal to the lowest in the

hybrid barks, whilst that of the highest of the hybrids merged into the lowest of the official barks.—Yearbook of Phar., 1888, 430–441.

Carthagena Bark—History and Experiments of Its Cultivation in India.—David Hooper communicates a paper to the Brit. Pharm. Conference, in which he gives a summary of the history of Carthagena bark and of the experiments connected with the introduction of Carthagena bark trees into the Nilghiri cinchona plantations of the Madras Presidency. The result of the experiments has been to show that the bark from the plants now being cultivated in the Nilghiris as yielding Carthagena bark is commercially valueless, stem-bark examined from two trees, one five and a half and the other six years old, yielding no quinine, and the root-bark only 1.1 per cent.—Yearbook of Pharmacy, 1888, 425–430.

Quina Morada—Constituents, etc.—Under the designation of "quina morada," a bark is known in Bolivia and the northern part of the Argentine Republic, which possesses, in an inferior degree, the therapeutic properties of cinchona bark. The name seems, however, to be applied to different barks, and Messrs. Arati and Canzoneri have received a false cinchona bark under the name of "quina morada," which they have determined to be the bark of

Pogonopus febrifugus, Benth. and Hook. They have isolated an alkaloid, tannic acid, and a fluorescent body from the bark. The alkaloid, which they have named

Moradeïne, was obtained in form of colorless, opaque prisms, which were sparingly soluble in water, easily in alcohol, in ether, and in chloroform, and which melted at 199.5°. The small quantity at the command of the authors did not permit an elementary examination to be made. The fluorescent body, which has been named

Moradin, appears to resemble in many respects the "scopoletin," obtained by Eykman from *Scopolia japonica*. It differs, however, from scopoletin in its elementary composition, which has been determined to be $C_{16}H_{14}O_8$. Moradin melts at 201.5° C., without volatilizing, and has acid characters; but the production of salts proved quite difficult, and was unsuccessful. It is in all probability an oxyhydrochinon, the products of its decomposition being: 1. a trioxybenzoic acid; 2. a high atomic phenol (oxyhydrochinon?); 3. benzochinon.—Arch. d. Pharm., June 1889, 521–522; from L'Orosi, Feb. 1889.

Ipecacuanha—Discovery of a Volatile Alkaloid.—E. M. Arndt in distilling a mixture of powdered ipecac, potassium carbonate, ferric chloride and water, noticed in the condenser white crystals while the distillate had an alkaline reaction and was fluorescent; the alkaloid was obtained in colorless cross-like crystals, fluorescent at the edges and deliquescent. The hydrochlorate crystallizes best in octahedral form, and can be obtained in quantity from 0.3 to 0.5 per cent. The nitrate does not crystallize even when attempted over H_2SO_4, resembling nitrate of

emetine. $PtCl_4HgI_2 2KI$, Nessler's reagent, and iodine solution, yield precipitates; NaOH on boiling evolves the odor of trimethylamine. The yield of emetine by the ferric chloride and potassium carbonate method of estimation is greater than by other methods, hence this precludes the decomposition of emetine.—Amer. Jour. Phar., Feb. 1889, 78; from Apoth. Ztg., 1888, 1036.

Ipecacuanha—Reliable Method of Assay.—R. A. Cripps and A. Whitby have made experiments to determine the most reliable and generally available method for assaying ipecacuanha. From the various processes proposed they selected those of Dragendorff (as modified by Lyons), Flückiger's ammoniated chloroform method, and Lyons' ammoniated ether method,* and compared them with similar processes, using acetic ether, chloroform acidulated with glacial acetic acid, and various mixtures of these solvents. The results of seventeen experiments made upon the same sample of root are given in the form of a table, to which reference may be had in the original paper. The conclusions arrived at by the authors are as follows:

1. That of the methods yet proposed, the process of Lyon's with ammoniated ether is to be recommended as most fully exhausting the drug, at the same time being rapid in execution. They, however, prefer to conduct the extraction by cold percolation, thereby avoiding so many weighings, the exhaustion being fully as complete.

2. That the ammoniated chloroform of Flückiger is decidedly objectionable.

3. The use of acetic ether alone, acetic ether with 1 per cent. of glacial acetic acid, or acetic ether, chloroform and glacial acetic acid, is attended with good results; the extraction is perhaps rather more rapid than by Lyon's solvent, and throughout the process works well.

Selecting one of these solvents, the process is carried out as follows: 2.5 grams of ipecacuanha root in fine powder are introduced in a small glass cylinder about 200 m.m. long and 11 to 12 m.m. internal diameter, very lightly shaken down, and a loose plug of cotton placed on the surface of the powder. 10 c.c. of the solvent are now poured on, and allowed to soak through the powder, care being taken to observe if any air-spaces or channels exist in any portion. When the fluid begins to drop from this percolator, the *upper* open end is securely corked to prevent any further flow of the liquid, and the whole allowed to macerate about ten hours, or preferably over night. Percolation is then proceeded with until about 50 c.c. of percolate is obtained or the root is exhausted; this is the case if six to ten drops of the liquid, when evaporated, and the residue dissolved in dilute sulphuric acid, give no precipitate with Mayer's solution. The solution thus obtained is introduced into a separator, and washed with *four* successive quantities (about 8 c.c. at a time) of slightly

* These methods have been described at different times in previous reports.—Rep.

acidulated water. The aqueous liquid now containing the emetine is washed once with ether while still acid, then rendered alkaline with ammonia, and washed *three* times with 6 c.c. of ether, followed by two successive washings with 6 c.c. of chloroform. The mixed ethereal and chloroformic solutions are washed once with water, then evaporated in a current of air, and dried by exposure over sulphuric acid for some hours; it is then weighed (this being one determination), dissolved in 20 c.c. of water acidulated with six drops of 5 per cent. (by volume) sulphuric acid, in which it should be entirely soluble, and titrated with Mayer's solution (half strength) in the usual manner (this being the second or confirmatory determination); 1 c.c.=0.00945 gram emetine. This method is to be followed when strictly accurate results are aimed at; under other conditions the method may be shortened, either by drying the alkaloid more rapidly, or by dissolving the moist alkaloid and titrating, or by titrating the aqueous solution shaken out from the ether solution direct. Incidentally the authors have determined *the amount of alkaloid also in the woody portion* of ipecacuanha root. This portion constituted 15 per cent. of the total weight, and yielded 0.8 per cent. of emetine, or 5 per cent. of the total amount in the sample.—Phar. Jour. and Trans., March 9, 1889, 721 to 724.

Cephalanthus occidentalis—Isolation of a Glyceride from the Bark.—See *Cephalanthus*, under "Organic Chemistry."

Coffee—Artificial Roasted Beans.—J. König describes artificial coffee which he had an opportunity to examine. The beans exhibited no material external difference from ordinary roasted coffee, except in the great uniformity, but the microscope revealed that they were composed exclusively of wheat flour, from which they were evidently made, being moulded and then roasted.—Arch. d. Pharm., Jan. 1889, 38: from Zeitschr. f. Angew. Chem., 22, 631.

CAPRIFOLIACEÆ.

Hedera Helix—Examination of the Constituents of the Fruit and Leaves.—Hermann Block has prepared the different constituents of the fruit and leaves of the ivy that have hitherto been isolated and described, and subjected them to comprehensive study and experiment. From the fruit he prepared the body which Posselt has designated as

Hederic Acid.—Davies, operating after the directions of Posselt, had obtained the same body, but found it to possess properties different from those ascribed to it by the former. Block's experiments now confirm the observations of Davies that the so-called hederic acid is not an acid, and that it is a perfectly indifferent body. In its moist condition it is perfectly white, but becomes slightly yellowish on drying, and is amorphous. It melts at 223°. With concentrated sulphuric acid it produces a fine red color, which on standing, or by heat, changes to violet. Posselt

had described the reaction as violet, while Davies stated it to be red, the conflicting observations being explained by the foregoing. The

Hedera-tannic Acid described by Posselt, was obtained by the author, and possesses the characters given it by the former. The existence of the two

Fatty bodies observed by Posselt is also confirmed, but in addition to the constituents of the seeds hitherto described, Block has determined the presence of

Cholesterin.—From the pulp of the fruit he isolated a handsome blue-red

Coloring matter, which is soluble both in water and alcohol. It has a neutral reaction, is changed to red by acids, and to green by alkalies, affording also a green color with neutral acetate of lead, while basic acetate of lead produces a green precipitate. The coloring matter, furthermore, may be separated into two portions, the one of a violet color, soluble in water alone; the other red, soluble in both water and alcohol. From the leaves the author separated by approximate means—which are described—the

Hedera-glucoside of Vernet, and found this to correspond in all of its characters with those given by the latter. The products obtained by Kingzett and by Harsten, and described by them as glucosides, were doubtless mixtures of this glucoside, of glucose and chlorophyll, as already pointed out by Vernet. Block has subjected this glucoside to ultimate analysis, and arrived at results which lead to the formula $C_{32}H_{52}O_{10}+2H_2O$. By heating with dilute sulphuric acid it is split into glucose and a crystallizable body having the composition $C_{26}H_{40}O_4$. Besides these bodies the author has determined the presence of a coloring matter identical with *carotin*, and two organic acids, *oxalic* and *malic*. The mineral constituents were likewise determined, comprehensive tables being given showing the quantitative results obtained from the different organs of the plant.—Arch. d. Pharm., Nov. 888, 953, 984.

UMBELLIFERÆ.

Asafœtida Plants—Review.—E. M. Holmes observes that notwithstanding the large amount of literature that has already been published on the subject, there appears to exist even at the present day a certain amount of confusion concerning the plants which yield asafœtida. This arises partly from the literature being published in several different languages, partly from the fact that the material existing in herbaria is comparatively small and imperfect and very unequally distributed in different countries, and partly from the remarkable resemblance which exists between species yielding entirely different gums. Under these circumstances, a review of the present state of our knowledge of the plants yielding asafœtida seems desirable, so that the distinctive features of the various species may be

more readily compared. This review the author has now made in a lengthy paper, which he concludes with the following brief enumeration of the distinctive characters of the asafœtida plants:

1. *Ferula fœtida*, Regel.—Leaves bipinnate, ultimate segments lingulate, entire; petals white, remaining after the formation of young fruit; umbels grouped near the apex of the stem, with white, crisped hairs; vittæ numerous, minute, not visible to the naked eye: fruit-wing nearly as broad as the end.

2. *Ferula Asafœtida*, Regel.—Leaves similar; petals yellow, caducous; the fruit-wing only slightly broader than half the seed; vittæ as in No. 1; peduncles thickened below after flowering; umbels as in No. 1, and also clothed with crisped hairs.

3. *Ferula Narthex*, Boiss.—Leaves as in No. 1 and 2; rarely serrate at apices; petals yellow, caducous; umbels axillary, from base to apex of plant, not hairy; vittæ solitary or 2 in the dorsal furrows, distinctly visible, slightly branched.

4. *Ferula fœtidissima*, Regel and Schmal.—Leaves, nearly same shape as 1, 2, 3, but with distinctly cerrulate margin; petals yellow; vittæ distinctly visible, 1–3 in the dorsal furrows, six on the commissure.

5. *Ferula alliacea*—Boiss.—Leaves obtusely dentate at apex, with spreading segments, cuneate below; fruit-wing one-fifth diameter of the seed; stem branches purplish-red; vittæ indistinct.

6. *Ferula rubricaulis*, Boiss.—Resembles *F. alliacea*, but the stem is terete; rays of umbel 20–30; fruit-wing only one-half the width of the seed; stem branches, purplish red; vittæ, indistinct.

7. *Ferula teterrima*, Karel et Kiril.—Leaves quadriternatisect; segments oblong, acute, entire, or 2–3 lobed; vittae solitary in the dorsal furrows, distinctly visible, 7–8 in the commissure.

8. *Ferula persica*, Willd.—Leaves pinnately decomposed; segments linear, small; petals pale yellow; fruit-wing one-quarter width of seed; vittæ in the dorsal furrows 3–4, numerous in the commissure.—Pharm. Jour. and Trans., July 14–21; Nov. 10, 1888; pp. 21–44, 41–44, and 365–368.

ARALIACEAE.

Ginseng—Varieties in Use in China.—John Henry Wilson states that five kinds of ginseng are known in Shanghai: four of them grown in Asia, and derived from *Panax Ginseng*, the fifth being American ginseng, from *Panax quinquefolium*. The most highly prized of all is the

Chinese Wild Ginseng ("yah-shan-shen"), for which fabulous prices are sometimes paid; as much as 60 taels (a tael = 5s.) is paid for a single root not larger than the little finger, the value depending in a great measure on the shape it assumes.

Chinese Cultivated Ginseng ("lean tong-shen") is next in value, and is cultivated in the northern provinces of China and in Manchuria. The rootlets are cut off immediately after gathering, a bamboo knife being used for this purpose—iron or steel are carefully guarded against—and the epidermis of the lower part is carefully scraped off. This ginseng has a yellowish brown color, and when the epidermis has been removed it has a translucent appearance not unlike horn. These roots, if they were not trimmed and scraped, would differ very little from the third variety, the

Corean Ginseng, which is of a light buff color, due possibly to less care in drying. The epidermis of Corean ginseng roots is thin and wrinkled, showing transverse rings, and the rootlets are thin and contorted. Its value, as in the other varieties, is enhanced by size and shape. The fourth variety is

Japanese Ginseng ("tong-yan-shen"), which is entirely different in appearance from either of the above. Its roots, as found in the shops, are fusiform, hard, woody, of a pale yellow color, deprived of rootlets, and vary in size from 2½ to 5 inches. The

American Ginseng ("mei-kwoh-shen"), is now uniformly found in a scraped condition. Crude, unscraped ginseng is now seldom imported. Pharm. Jour. Tran., July 7, 1888, 2.

RANUNCULACEÆ.

Cimicifuga racemosa, Elliot—*Proximate Examination of the Rhizome and Rootlets.*—Dr. C. J. Rademaker communicates the result of a proximate analysis of cimicifuga racemosa:

Cimicifuga racemosa was dried and the loss in weight was	6.23
To petroleum spirit the drug yielded eight (8) per cent. of fixed oil and wax	8.00
To absolute ether, ten (10) per cent. of resin, crystalline principle and chlorophyll	10.00
To chloroform the drug gave three (3) per cent. of solid matter composed of resin, crystalline principle and chlorophyll	3.00
The drug was next treated with absolute alcohol; this left two and one-quarter (2¼) of fixed residue composed of resin, an acid, crystalline principle and chlorophyll	2.04
To distilled water the powdered drug gave twelve and one half per cent. (12.50) solid matter composed of gum, sugar, tannin, starch and extractive matter, such as soluble salts	12.50
To a two (2) per cent. solution of caustic soda, the drug gave one and three quarters (1¾) per cent. of solid matter composed of mucilage and albuminoids	1.75
And to one per cent. solution of hydrochloric acid, four (4) per cent. of residue was obtained, composed of organic compounds and inorganic salts	4.00
Cellulose as residue	52.48
Total	100.00

The crystalline principle obtained in the ether, chloroform and alco-

holic extracts was insoluble in water, but soluble in alcohol, chloroform, ether and dilute hydrochloric acid. Its solutions in alcohol, ether and chloroform were neutral to litmus paper, and had a decidedly bitter and acrid taste.

The constituents of this drug may then be summed up as follows:

Crystalline, neutral or bitter principle, resin, fat, wax, tannin, starch, gum, sugar, and an acid of which he did not obtain a sufficient quantity to give an opinion. The crystals are of a color resembling old gold. The author believes the crystalline principle to represent the virtues of the drug.—Phar. Rec., Jan. 7, 1889, 9; from Medical Herald.

Aconitum Napellus—Experiments on its Cultivation in England.—E. M. Holmes reported to the British Pharmaceutical Conference the progress made in the experiment he had undertaken in the cultivation of a definite form of *Aconitum Napellus,* with a view to furnishing suitable material for a more trustworthy chemical investigation of the root than has hitherto been possible. He described three forms that he has selected —from Colchester, St. Neot's, and Riverhead—as approximating in his opinion to typical plants, and recounted the observations made during the cultivation of specimens in his own garden. Some rough experiments, in which the relative activity of the plants was estimated by the intensity of the numbing sensation produced upon the tongue on chewing the seeds, seemed to indicate the desirability that a separate chemical examination of each form should be made. Some interesting information was also given as to the probable yield of root, and the best method of propagation under the conditions of cultivation.—Yearbook of Pharm., 1888, 338–349.

Aconite Root—Proper Time and Precautions in Collections.—P. W. Squire contributes a paper in which he details his observations respecting aconite root at different stages of its growth. As a result of his observations he concludes that the proper time for the collection of medicinal aconite root would be in the autumn, when the root is in perfection, and when there would be no difficulty in separating the old decayed roots. But the roots of *Aconitum Napellus* differ in appearance and microscopic structure (as shown by the author in his present paper), as they do from *Aconitum paniculatum;* consequently, it would not be possible to distinguish with certainty, and separate from one another, a mixture of the two roots, except by taste—that of *A. Napellus* roots being quite pronounced at this period, producing a benumbing sensation upon the tongue, while the roots of *A. paniculatum* produce no such effect—nor would it be possible in digging up roots in the autumn to distinguish the one from the other by their external characters. It would be equally impossible for the herb-gatherers to taste each individual root. As, however, *A. Napellus* flowers some time before *A. paniculatum,* it would be quite easy to distinguish the plants in the summer. The author therefore suggests that

the places where *A. Napellus* abounds should be taken note of and marked in summer, when the plants in flower can be recognized. Whether this plan is practicable on a large scale in the wild condition of the plant is an open question; but it certainly is in the cultivated state, and any stray *A. paniculatum* can be weeded out. The increased cost of cultivation would be fully compensated by the certainty of having the right plant gathered at the best time.—Phar. Jour. and Trans., Feb. 16, 1889, 645–647.

MAGNOLIACEÆ.

Magnolia glauca, L.—*Proximate Examination of the Leaves.*—Wilbur Fisk Rawlins has subjected the fresh leaves of *Magnolia glauca*, L., to proximate examination. The leaves, gathered in September, lost 60 per cent. on drying in air, and an additional 10 per cent. at 110° C. The air-dried leaves yielded 10 per cent. of ash. They yielded to petroleum spirit 5 per cent., four-fifths of which was dissipated by heat, the remainder being composed partly of insoluble waxy matter. Ether then extracted 4 per cent., containing besides chlorophyll, a crystallizable resin. Absolute alcohol dissolved 5 per cent. of the residual drug, the residue of evaporation containing tannin, together with a crystallizable glucoside having characters distinct from those ascribed to the magnolin of Procter. Water dissolved 13 per cent.; caustic soda, 4 per cent.; dilute hydrochloric acid, 2 per cent.; chlorine water, 6 per cent.; chlorate of potassium and nitric acid, 2 per cent.; representing mucilage, coloring matter, and lignin principally.

Three pounds of the fresh drug were distilled with water. From the distillate, by shaking with ether, was obtained a volatile oil of a bright green color, with a penetrating odor resembling that of fennel or anise, but more pleasant. The yield was very small, about one drachm being obtained from the three pounds. While the solution of oil in the ether was filtering, the rapid evaporation of the ether caused crystals to form on the edge of the filter, but they soon volatilized and no examination was made of them.—Amer. Jour. Phar., Jan., 1889, 6–8.

Magnolia glauca—Use of the Leaves as a Substitute for Indelible Ink.—In connection with the above paper Prof. Maisch remarks, that it does not appear to be generally known that the fresh leaves of the magnolia glauca may be used in the place of indelible ink for the marking of linen and other fabrics, by placing upon the latter the lower surface of a leaf, and tracing upon the upper surface with a blunt peg, using some pressure, the desired characters. The writing appears upon the fabric at first of a grayish green color, which gradually becomes darker, and does not disappear on washing.—Ibid, 8.

Star Anise—True Botanical Source.—In 1880 Dr. Bretschneider called attention to the fact that *Illicium anisatum* is not the true botani-

cal source of star anise, and that the plant producing this article was still unknown. Since then seedlings of the true plant have reached the Kew Gardens, and these having flowered, Sir Joseph Hooker has been enabled to give a description of the new plant. He points out that the plant must be placed in quite a different section of the genus from that to which *I. anisatum*, L., belongs, since it has broad obtuse perianth segments, and the peduncles are not bracteate at the base. He describes it as a new and hitherto undescribed species, as follows:

"*Illicium verum*, Hook. f. (Bot. Mag., t. 7005, July 1888.)—*Illicium verum:* foliis elliptico lanceolatis v. oblanceolatis obtusis v. obtuse acuminatis in petiolum brevem angustatis floribus axillaribus breviter pedunculatis globosis, perianthii foliolis ad 10 orbiculatis concavis coriaceis exterioribus majoribus ciliolatis intimis rubris staminibus ad 10 brevibus, filamento cum connectivo, in corpus carnosum subovoidem confluente, loculis adnatis parallelis subremotis oblongis, carpellis ad 8 stigmatibus brevibus vix recurvis carpellis maturis ad 8 cymbiformibus longiuscule rostratis.

Mr. E. M. Holmes observes that the leading features in this plant appear to be the solitary axillary globular flowers, which do not expand fully, the segments remaining convex, the inner segments being red, and the ten stamens, in which the filament forms with the connective an ovoid body. The peduncles are curved and barely half an inch in length. It may be here remarked that a very similar plant, but with smaller and yellowish flowers, has been grown at the Botanical Gardens at Regents' Park for the last eighteen years under the name of *I. anisatum*, but the leaves of this species have a sassafras taste. They differ from those of *I. religiosum* in having the midrib prominent below and depressed on the upper surface of the leaf, while in *I. religiosum* the midrib is prominent on the upper and not on the lower surface, and the taste is astringent and terebinthinous.—Amer. Jour. Phar., Oct. 1888, 502; from Pharm. Jour. and Trans., Aug. 11, 101.

BERBERIDEACEÆ.

Podophyllum Emodi—Examination of the Root.—W. Dymock and D. Hooper give a description of the Himalayan species of *Podophyllum* (*P. Emodi*), and the results of the chemical examination of the root, as well as of its physiological action. The root agrees in most particulars with that of *P. peltatum*, but the intervals of knots are more frequent. It yielded about 12 per cent. of resin, soluble in alcohol, ether and chloroform, and almost entirely so in ammonia water. It was found to be unmistakably cathartic in its effect, when administered in dose of ½ gram rubbed with sugar, attended with slight griping, as is the case when "podophyllin" is administered by itself. The large yield of resin is noteworthy.—Phar. Jour. and Trans., Jan. 26, 1889, 585.

RUTACEÆ.

Guaiac Resin—Analysis of Commercial Samples.—John Herman Rabenau examined four commercial specimens with the following results:

	Nos. 1.	2.	3.	4.
Soluble in petroleum benzin	.006 per cent.	.002 per cent.	.01 per cent.	
Soluble in ether	52.8 "	73.9 "	66.9 "	49. per cent.
Treatment of ether extract with KHO, then HCl; precipitate weighed . . .	29.4 "	54.7 "	28.1 "	30.7 "
Portion insoluble in ether, soluble in alcohol . . .	9.9 "	6.1 "	12.2 "	completely.
Ash from original resin . .	6.45 "	4.75 "	9.75 "	trace.

—Amer. Jour. Phar., Dec. 1888, 606.

"Amber" Guaiac—Examination.—C. Carroll Meyer calls attention to a form of guaiac resin which has recently been introduced into the market under the designation of "amber guaiac" and recommended as perfectly pure. It is perfectly clear and free from pieces of wood and bark, and being so different from the ordinary guaiac of the market, and slightly resembling pitch, the author made some experiments to determine its purity and character. His results seem to prove the article to be pure guaiac resin. It is almost completely soluble in alcohol and in aromatic spirit of ammonia, whereas a good sample of ordinary guaiac leaves a residue of about 40 per cent. Hence it becomes a question whether the pure so-called "amber" guaiac should be used in place of the more impure article contemplated by the U. S. Pharm., or whether the quantity should not be decreased when making the officinal preparation with it.—Amer. Jour. Pharm., June 1889, 286.

Diosma crenata and D. betulina—Isolation of a glucoside, Diosmin, which see under "Organic Chemistry."

GERANIACEÆ.

Geranium maculatum—Proximate Examination.—Henry J. Mayers has subjected geranium root to proximate examination, with the following results. *Petroleum ether* extracted 0.210 per cent. of wax and fat (of yellow color, solid at ordinary temperatures, melting at 60° C., soluble in stronger ether, chloroform and hot 95 per cent. alcohol), and a trace of volatile oil. *Stronger ether* extracted 0.25 per cent. of a dark-brown bitter resin, soluble in alcohol, and 0.21 per cent. of gallic acid. *Absolute alcohol* extracted 2.48 per cent. of tannin, 8.92 per cent. of phlobaphene (altered tannin), and small amounts of sugar and a crystallizable principle not estimated. To *distilled water* the residue yielded 1.12 per cent. of mucilage, 2.58 per cent. of dextrin, and 5.84 per cent. of sugar; while dilute alkalies dissloved 4.64 per cent. of mucilage and 2.88 per cent. of

albuminoids. The ash from separate portions of the drug was 8.75; the moisture 5.02 per cent.

The amount of tannin found was so low as to demand verifying, which was undertaken by exhausting 10 grams of the drug with boiling water. This decoction, with gelatin and alum solution, indicated 4.25 per cent. This discrepancy not being satisfactory, another portion of the whole drug was purchased and powdered. In this lot, by the gelatin and alum process, 11.53 per cent. were obtained. These differences in the amount of tannin may be explained by supposing that the two lots of drug were collected at different times in the year, or the first lot, coming from stock kept in the powdered state, had changed; the quantity of phlobaphene, as may be noticed, being excessive.—Amer. Jour. Phar., May 1889, 238–239.

LINACEÆ.

Flaxseed—Adulteration of the Ground Article.—George M. Beringer states that a sample of ground flaxseed, recently offered, showed upon examination the following peculiarities: With iodine, the decoction gave a copious reaction for starch; it yielded to petroleum ether, 20.92 per cent. of oil; ash 3 per cent. On examining the sample microscopically the starch was identified as that of corn. A sample of pure ground flaxseed gave no reaction for starch, and yielded to petroleum ether 32.97 per cent. of oil; ash, 4.5 per cent. The sample offered was evidently adulterated with corn meal to the extent of about forty per cent., judging from the small yield of oil and ash. A sample of corn meal examined yielded to petroleum ether only 2.65 per cent. of oil; ash, 1.2 per cent. The adulteration of ground flaxseed with such material is likely quite common, and may be easily detected by the test for starch.—Amer. Jour. Phar., Apr. 1889, 167.

Linseed Cake—Cause of Error in the Determination of Residual Oil.—R. Klopsch states that in a linseed cake containing 11 per cent. of fat, two successive analyses gave only 4.5 and 4.8 per cent. In searching for the cause the author found that prolonged desiccation with heat renders the fatty matter insoluble in ether. The author recommends that the drying process should not be prolonged beyond three hours.—Chem. News, Oct. 19, 1888, 197; from Zeitsch. f. Analyt. Chem., xxvii, No. 4.

Referring to Mr. Klopsch's observations on linseed oil cake, Thomas T. P. Bruce Warren observes that the cause of the change is quite easy to understand; the residual oil contained in a cake is very liable to oxidation, and a thoroughly oxidized oil is practically insoluble in any solvent. Crushed poppy-seed is remarkable in this respect; and, as a rule, the insolubility of the residual oil is just in proportion to its tendency to oxidize: heat invariably facilitates this. In drying an oil-cake the same precaution should be taken as in drying an oil or fat, but which unfortunately seems neglected. The author makes some suggestions respecting

the methods of examining oil-cakes in general, for which see Chem. News, Nov. 2, 1888, 211.

TERNSTROEMIACEÆ.

Tea—Observation of a New Base.—The announcement by A. Kossel of the discovery of a new base—"theophylline"—in tea, has prompted Messrs. B. H. Paul and A. J. Cownley to state that for some time past they have known of and determined the existence of a second base in Himalayan tea, but that the quantity so far obtained was too small to admit of its complete study, and the publication of their discovery had on this account been deferred.—Pharm. Jour. and Trans., July 14, 1888, 24.

Tea—Determination of Tannin.—See *Tea-Tannin*, under "Organic Chemistry."

GUTTIFERÆ.

Gamboge—Analysis of a Sample.—George H. Hurst has analyzed a sample of gamboge with the following results: Moisture, 2.5; mineral matter, 1.05; resin (from ether), 66.05; wax (from alcohol), 4.31; gum, 26.03 per cent. The

Resin of Gamboge was of a reddish orange color, transparent, glassy-looking, very brittle, with conchoidal fractures. It softens easily on heating, melts at between 75° and 80° C., and again solidifies on cooling to a glassy mass. It is readily soluble in alcohol, in ether, and in chloroform, very sparingly soluble in petroleum spirit, dissolves with an orange color in sodium hydroxide solution, and is reprecipitated from such by acids in the form of gelatinous flakes. It has no taste or apparent purgative action. The

Wax is a peculiar looking brownish mass with a waxy lustre; it is soft, melts easily, has a peculiar but slightly bitter taste, and leaves a bitter after-taste, which is perceptible for some time; it has also a slight purgative action. It evidently undergoes quasi-saponification with caustic soda, forming a yellow solution. The

Gum is a transparent brownish mass, with a sweetish taste and slightly adhesive properties. It forms an opalescent solution with water, which is not precipitated by mercuric chloride, lead acetate, or alcohol. Dilute acids dissolve it, and strong nitric acid forms mucic—but not oxalic acid. It has a slight reducing action on Fehling's solution, which is considerably increased on boiling with dilute acids, and it is, therefore, a glucoside.—Pharm. Jour. and Trans., March 23, 1889, 761–762.

VITACEÆ.

Sherry Wine—Adulteration in Spain.—In the Consular report of Ant. J. Bensusan, Acting U. S. Vice-Consul at Cadiz, the following, respecting the adulteration and manufacture of sherry wine, is given: It has

been considered generally that low sherries cannot be fit for shipment until the third year, and so it would be if left entirely to nature; but such wines in the hands of intelligent persons in the matter, by repeated fining and raking off, reinforcing well with alcohol, and other operations adopted by wine merchants, have, in fact, of late been shipped within the second year. A great part of the wine shipped is not above twelve months, and this is the sweet or checked wine, of which a good portion enters into the combination of low sherries.

The sweet wine is made thus: During the vintage, and after the grape is pressed, they put 25 gallons of alcohol or spirits of about 66 per cent. overproof to a butt, and the rest is completely filled with the must or juice of the grape, and bung made fast. The spirits stop the fermentation of the wine, which then becomes perfectly sweet. This wine can be got ready for shipment within twelve months or less, but it is only used as an auxiliary for the preparation of wines.

In general the low-priced sherries are blended or composed of four or more different sorts, viz., alcohol or spirits, sweet wine, colored wine, cheap new wines of different kinds, and sometimes of a few gallons of older wines to help the whole to an older appearance. Fine sherries, on the contrary, are kept in their natural state of very pale and dry for six or seven years, and sometimes longer; and these wines, which from their first growth are costly and become still more so by the length of time required, are very frequently disapproved by such as find other sorts of wine more to their taste, and worth perhaps the tenth part of the above stated varieties.

Another way, and the best way, to "forward" wines is by the use of "soleras," or mother-wines. The said soleras are a number of butts of old wines, more or less good, but always old; these butts of wine to be made use of are generally half full, the other half being filled with a new wine, which, in the course of a very short time, gets so forwarded that it becomes an "old" wine under that treatment. A quantity is then taken from each butt to be made use of in the preparation of wines, and the quantity taken off is again replaced with new wine to let it grow again in the same manner. The same way of carrying on the business is hardly to be found in any other country, or even in any other part of Spain.—Amer. Drugg., May 1889, 86.

Wine—Manufacture from Currants.—E. Hancock, U. S. Consul at Patras, Greece, reports as follows on the industry of making wine from currants, which is assuming enormous proportions in France, owing to the great destruction of vines by the phylloxera.

The process of wine-making from dried currants is exceedingly simple. The fruit is emptied out of the barrels or sacks in which it arrives into large wooden tubs, of a capacity of several tons, and twice or thrice (according to the quality and strength of wine which it is intended to

produce) the amount of water is added. During cold weather it is necessary to artificially heat the water to an average summer temperature, otherwise the fermentation would be too long delayed, but under ordinary circumstances the fermentation has taken place, and the liquid is ready to be strained in a period from eight to ten days. When this last operation has taken place, the liquid is ready for immediate use, and can in no way be distinguished from ordinary light wines; it is of a light-ruby color, and possesses a strength, according to the amount of water that has been added, of from 9 to 13 degrees. Wholesale dealers usually sell it at so much per degree of alcoholic strength. It is also employed for the manufacture of superior brands of wine, and this is done by the admixture of strong and colored Spanish, Italian, and Dalmatian wines, and by various other processes well known in France. This should not, however, cause any prejudice against similar wines, for they contain nothing deleterious or in any way injurious to the consumer, for the currant in its original state is simply a small stoneless grape, which produces an excellent, strong, fruity-flowered wine; the French, therefore, in adding water to the dried fruit, are merely replacing what has been drawn out of it by the action of the sun in the process of drying.—Amer. Drugg., Jan. 1889, 12.

Raisin Wine — Formula and Preparation. — Palangié recommends the following formula for making "raisin wine": Corinth raisins, 25k.; sugar, 4k.; fresh grapes, 1k.; tartaric acid, 25 gm. Exhaust the raisins with three waters; press and unite all the liquors in a cask. Dissolve the sugar and tartaric acid in water, and boil for a few minutes; add this to the other liquors, with water to make a hectoliter; then add the grapes, previously bruised, and keep the mixture at a temperature of 77° F. In 48 hours from the beginning of fermentation the air in the cask must be renewed, and this must be repeated daily until fermentation ceases. The wine should stand for a month before bottling.—Amer. Jour. Pharm., May 1889, 245; from Jour. de Pharm. et de Chim., March 15, 1889.

ERYTHROXYLACEÆ.

Coca Leaves—Assay.—Van der Marck proposes the following method for the assay of coca leaves: 50 grams of the powdered leaves are mixed with water and 20 grams of magnesia, dried at 60° and extracted with ether; the solvent is distilled off, the residue is exhausted with 2 per cent. hydrochloric acid (about 30 c.c. are needed), the acid solution filtered and agitated with ether until coloring matter is no longer extracted, then rendered alkaline with ammonia and agitated with three successive portions of ether of 25 c.c. each; after drying the ether with fused calcium chloride, the ethereal solution is separated, the ether distilled off, and the residue weighed, after drying in a desiccator.—Am. Jour. Phar., June 1889, 294; from Pharm. Ztg., 1889, 282.

Erythroxylon Novo-Granatense—A New Erythroxylon.—At a recent

meeting of the British Linnean Society a paper was read by D. Morris on the characteristics of the plants included under *Erythroxylon Coca*, Lamarck, with a description of a new variety, which he proposed to name from its origin, *E. Nova-Granatense*. He pointed out that the well-known coca plant had been noticed by botanists and travelers for the last three hundred years, and that although Clusius was generally regarded as the earliest writer on it, he had been anticipated by Nicholas Monardes in his "Historia Medicinal," published at Seville, in 1580, and translated by Clusius, who printed it in a condensed form in his "Exoticorum Libri Decem," in 1605. The plant was first described as a species by Lamarck in the "Encyclopédie Méthodique" in 1786, from specimens brought by De Jussieu from Peru. Mr. Morris stated that it occurred under several climatic forms, which, however, were all nearly related varieties of the same species.—Drugg. Circ., April 1889, 81.

POLYGALACEÆ.

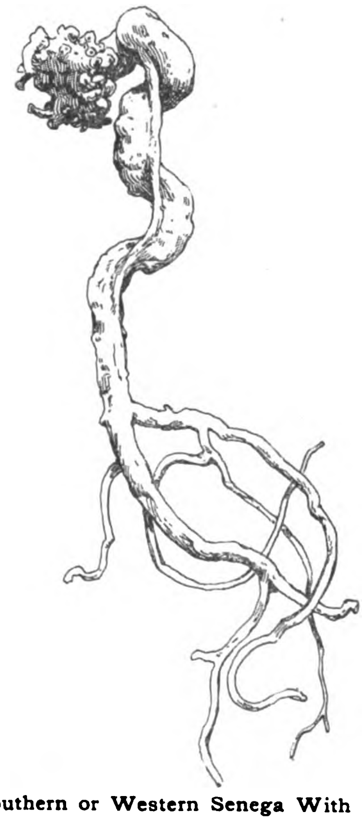
Senega—Plants Yielding the Commercial Supply.—Prof. J. U. Lloyd has communicated an important paper on the commercial sorts of senega root, which satisfactorily explains the botanical source of the varieties of the drug designated respectively as southern or western and northern senega. Respecting the

Southern or Western Senega he observes that the typical species is *Polygala Senega*, L., which is found in the northern Atlantic States and Canada, and its roots are evidently those originally employed in medicine. The plant does not, however, grow abundantly in any locality, and with the progress of agriculture, and the consequent destruction of the forests, the localities of its growth have gradually been removed to the western and south-western border States, so that gradually Virginia, Tennessee, North Carolina, Arkansas, Kentucky, Ohio, Indiana, Illinois, and Missouri, became the main sources of supply—*Polygala Senega*, L. and *P. Senega*, var. *latifolia* being exclusively the plants yielding the drug. The roots of these two plants are identical in every particular, it being immaterial whether they have grown in Vermont and other New England States, or in the States mentioned, and they correspond exactly to the description given in the text-books. This kind of senega, which by the gatherers is called "small senega," seldom attains at the base the size of an ordinary lead-pencil, about 400 of the larger dried roots being required to make one pound. In the author's experience the characteristic keel of senega root is distinct only in the young (immature) roots; it begins to diminish with age, and in older roots is frequently distinctly observable only at the lower end.

Northern Senega.—The larger roots of commerce, known now under the name of "northern senega," made their appearance in the beginning of the seventies. They are collected in Wisconsin and Minnesota,

and are gradually replacing the smaller variety, which is becoming scarcer in the market from year to year. Its decidedly larger size, as well as other minor differences, caused it to be looked upon with suspicion, but the investigations of C. G. Lloyd proved very conclusively that the mother plant of this senega is a variety of *Polygala Senega*, L., apparently intermediate between this and the variety *latifolia*. This plant has narrower leaves than the variety *latifolia*, but they are broader than those of the typical plant of the New England States. The "northern"

FIG. 27.



Southern or Western Senega With Keel.

senega root is occasionally as much as an ounce in weight, though usually they will average about 80 roots to the pound; the knotty head of the root is quite large—from 1 to 3 inches in diameter; the root itself, from ½ to 1 inch in diameter, very sparingly branched, not very contorted, and nearly free of the small rootlets so characteristic of the "southern" senega. The ligneous portion of the root is quite thick, and surrounded with a uniform cortical layer. The taste is about the same as that of the "southern" senega, but somewhat more mucilagin-

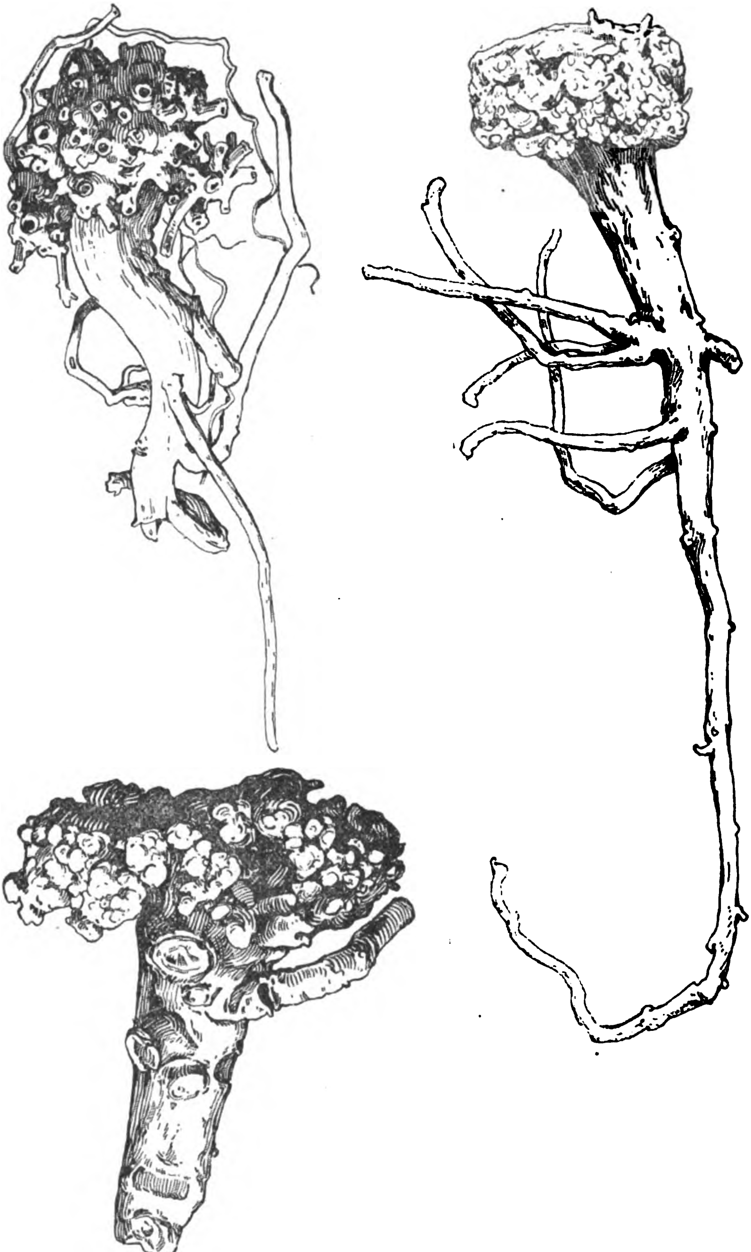
ous; hence the characteristic acidity does not manifest itself as quickly. The color varies as it does in the "southern" root, from straw-yellow to deep brown, and it is generally devoid of the characteristic keel. The accompanying cuts (Figs. 27, 28 and 29) show the distinctive characters of the young (immature) and older roots, as well as of the larger roots of the "northern" senega. Regarding the adulterations which have been observed at different times, the author is convinced from his very extended experience that, at least as far as this country is concerned, this is

FIG. 28.

Southern or Western Senega Without Keel.

never intentional, other roots being possibly admixed by carelessness during transportation and packing. Regarding the roots of *Polygala Boykinii*, the only *Polygala* indigenous to the southern states, and which Maisch had regarded to be the source of the false *white* senega found in the market some years ago, Prof. Lloyd observes that he has never observed the root of this plant in any of the consignments of senega root from the southern states. Indeed, Prof. Chas. Mohr, one of the best au-

FIG. 29.



Northern Senega.

thorities on the flora of the southern states, is of the opinion that the occurrence and distribution of *Polygala Boykinii* is so limited that it cannot be collected in quantities to compete with true senega.—Pharm. Rundschau, April 1889, 86–89.

Senega Root—Examination of Different Commercial Samples.—Ludwig Reuter communicates a lengthy paper, in which he gives in some detail the results of the proximate examination of different commercial samples of senega root. The constituents of senega root so far determined are: (1) fixed oil and resin; (2) traces of volatile oil (a mixture of valerianic ether and methyl-salicylic ether); (3) sugar (7 per cent.); (4) senegin (2 to 5 per cent., identical with saponin); (5) yellow coloring matter; (6) malates. As the result of the author's studies and investigations, he considers it of primary importance to determine the amounts of volatile oil, of resin and fixed oil, and of water, for the establishment of the quality of a sample of senega root. In the course of his preliminary experiments, which were quite comprehensive, he examined eight samples of senega root, designated as follows: I. "southern"; II. "northern"; III. "depurat."; IV. "depurat."; V. "15 years old"; VI. "senega from Brussels"; VII. and VIII. not particularly designated. He obtained from the moist-cut roots the following percentages of *ether extract* (principally resin and fixed oil): I.=3 per cent.; II.=3.2 per cent.; III. =3.8 per cent.; IV.=4.7 per cent.; V.=4.6 per cent.; VI.=3 per cent. VII.=4.66 per cent.; VIII.=3.25 per cent.; from the dry powders of No. 5 I., II. and III., 7, 7 and 7.9 per cent. respectively. The relative amounts of fixed oil and resin seem to vary with the age, the older root containing a large proportion of resin; the proportion of the latter in IV. and VII., for instance, being $\frac{1}{12}$ and $\frac{1}{11.5}$ of the whole, whereas in the case of the 15 years old sample it amounted to $\frac{1}{4}$ the weight of the ethereal extract. The quantity of methyl salicylic ether in the different samples was: I.=0.28 per cent.; II.=0.25 per cent.; III.=0.30 per cent.; IV.= 0.33 per cent.; while V. and VI. contained none. The *sugar* was determined in four samples, and, calculated for grape sugar, was found to be 5.5, 6.2, 6.35, and 7.3 per cent. respectively. *Senegin* was not determined. The amount of water in five samples, was: 9.3, 10.3, 10.0, 10.7, and 12.0 per cent., the latter being an admirable sample and highly odorous. It may be taken as a rule that the older drug contains less volatile oil and less moisture on the one hand, and more resin on the other. The author, in fact, regards the relative amount of volatile oil as of primary importance, and proposes as a test for the good quality of the drug the following, to be embodied in the (Germ.) Pharmacopœia:

"5 grams of air-dry senega root macerated for 15 minutes with 50 c.c. of water at 60° C. should yield a filtrate, which, acidulated with 3 drops of hydrochloric acid, and shaken with 50 c.c. of ether, should yield to the latter sufficient salicylic acid to give a distinct violet color-reaction with

one drop of solution of ferric chloride in the aqueous solution obtained by allowing the ether to evaporate spontaneously and taking up the residue in 20 c.c. of water at 60°."

Further experimental data must be gathered to determine the eventual value of the determination of resin and fixed oil.—Arch. d. Pharm., April and May, 1889, 309–317, and 452–459.

PAPAVERACEÆ.

Stylophorum diphyllum, Nuttall—*Alkaloidal Constituents.*—According to the investigations of Prof. E. Schmidt, the root of this American plant contains chelidonine, with a second alkaloid closely related to, if not identical with chelerythrine.—Am. Jour. Phar., Nov. 1888, 562; from Pharm. Ztg., 1888, 572.

CRUCIFERÆ.

Sinapis juncea and Brassica nigra — Comparative Examination of the Seeds.—Paul Birkenwald, in connection with his examination of *oil of mustard,* (which see under "Organic Chemistry,") has made a comparative examination of the seeds of *Brasscia nigra* and *Sinapis juncea,* with the following results:

		Brassica nigra.	Sinapis juncea.
Moisture		8.47 p. c.	7.63 p. c
Ash		5.04 "	4.52 "
Phosphoric Acid		1 84 "	1.89 "
Soluble in Petrol. Spirit	Used in succession	29.37 "	30.10 "
" Ether	Used in succession	0.93 "	1.30 "
" Abs. Alcohol	Used in succession	0.80 "	1.25 "
" 75 p. c. "	Used in succession	6.77 "	6.40 "
Nitrogen		4.50 "	4.21 "
Sulphur		0.61 "	0.54 "
Vol. Oil (calcul. from amount of S.)		1.89 "	1.67 "

—Schwz. Wchnschr. f. Pharm., 1888, 277.

Mustard—Preparations, etc.—Prof. J. M. Maisch, commenting on the *Tincture of Mustard* proposed by J. W. England, (see under "Pharmacy"), which he considers to be a preparation deserving the attention of physicians, calls attention to the fact that liquid preparations of mustard for internal use were employed quite commonly until the beginning of this century, but are at present used to a very limited extent. He gives formulæ for a number of preparations, taken from the Pharmacopœia Universelle, by A. I. L. Jourdan (Paris, 1828), and other works of difficult access to pharmacists generally, which may properly find place here for convenient reference.

Vinum Sinapios; Collutorium Sinapi.—This is made of two strengths, respectively ℥ss. and ℥j to a pound of white wine. After macerating for six hours, the mixture is filtered, and ℥ij tincture of cinnamon is added.

Serum Lactis sinapinum s. cum Sinapi.—A formula credited to the Pharmacopœias of Holland, Hessia, Lippe and Sardinia, directs that ℥ij of bruised mustard seed be boiled with 2 lbs. of cow's milk, until coagulated, when filter. An improved formula is that of Swediaur (1817.) It consists in triturating together ℥j mustard seed and lb. j of cow's milk, adding a sufficient quantity of Rhenish wine, coagulating by heat, and straining.

Syrupus Sinapis is prepared by adding 1 part of spirit of mustard to 100 parts of simple syrup.

Spiritus Sinapis of the German Pharmacopœia is a solution of one part of volatile oil of mustard in 49 parts of alcohol.

Aqua Sinapis, which was formerly prepared by macerating black mustard in water and distilling, is recommended by Hager to be made by dissolving one drop of the volatile oil of mustard in 250 gm. of distilled water.—Amer. Jour. Pharm., March 1889, 126–127.

VIOLACEÆ.

Viola cucullata—Proximate Constituents of the Rhizome.—Messrs. F. B. Power and Walter M. Carr, in the course of their search for "violine" (see under "Organic Chemistry"), which Boullay had described as occurring in the rhizomes of *Viola odorata*, determined in the rhizomes of the American violet—*V. cucullata*—wax, fat, chlorophyll, resin, sugar, mucilage, and starch. They also searched for salicylic acid, which Mandelin determined in the rhizome of *Viola odorata*, but failed to get any evidence of its presence. The resin, which was acrid, and had an odor reminding of that of podophyllin resin, was found to possess in 5 grain doses a gentle purgative action. It did not produce any nausea or other effect resembling such as produced emetine. Neither was the alkaloid violine, which was separated in small quantities, identical with emetine, as conjectured by Prof. Husemann.—Phar. Rundschau, Jan. 1889, 11–12.

PORTULACEÆ.

Lewisia rediviva, Pursh.—*Analysis of the Root.*—Henry Trimble has received some roots of *Lewisia rediviva*, Pursh, used as food by the Indians from the Rocky mountains westward to the Pacific, where it abounds. The plant is variously known as "Spathum," "Chita," and "bitter root," and has been fully described by Dr. V. Harvard—this description being reproduced in the present paper. The roots received by the author were free from bark, of a white color, and ready for use as food. No evidence of sugar as glucose or saccharose could be obtained. Tests for tannin likewise gave negative results. The most important constituents are starch, gum and mucilage, the last two are not readily precipitated by alcohol. The following summary gives the amount of the most important food constituents:

Fat, resin and wax	4.98
Gum and mucilage	14.80
Albuminoids	3.58
Starch	8.57
Moisture	12.17
Ash	2.53
Woody fibre and undetermined	53.37
	100.00

The amount of starch found may appear small when we consider the uses of the root, but the large amount of gum and mucilage make up for this deficiency.—Amer. Jour. Pharm., Jan. 1889, 4–6.

SAXIFRAGACEÆ.

Saxifraga ligulata—Description and Proximate Analysis of the Rhizome.—David Hooper has subjected the rhizome of *Saxifraga ligulata*, a plant abounding in the Punjab Himalayas, to proximate examination. The drug, which is known in the bazaars under the names of "pakh'anber," "jintiana," and "maslún," enjoys a reputation as poultices for boils and in ophthalmia, is reckoned absorbent, and is given in dysentery and cough. It occurs in pieces of one to two inches long, and about a half to one inch in diameter: externally brown, wrinkled and scaly, and bearing numerous scars, rootlets and circular markings; internally reddish, dense and hard. The rhizome appears to have been cut up before drying. The red color of the sections is evidently developed by age, as a fresh cut shows the interior to be much lighter, or almost white. Under the microscope numerous conglomerate crystals and ovoid cells are observed. The taste is slightly astringent, and the odor is similar to that of tar, but more aromatic. The following table gives the quantity of the different constituents of the rhizomes, as determined by the author's analysis:

Wax and odorous principle	.92
Gallic acid	1.17
Tannic acid	14.28
Glucose	5.60
Mucilage	2.78
Metarabin, albumen, etc.	7 85
Starch	19.00
Calcium oxalate	11.61
Mineral salts	3.80
Sand	.58
Crude filtre	20.80
Moisture and loss	11.61
	100.00

The author observes that the root of *Polygonum Bistorta* contains some of the same constituents as those found in *Saxifraga ligulata*, a cir-

cumstance of some importance to the native druggist, as one of the bazaar names of the latter, "maslún," is applied equally to bistort root, and, on the authority of Dr. Stewart, the one is often sold for the other.—Pharm. Jour. and Trans., Aug. 18, 1888, 123–124.

LOASEÆ.

Eschscholtzia californica—Occurrence of Morphine.—According to Bardet the narcotic power of *Eschscholtzia californica* is weak; doses of 10 to 12 gm. of the extract were necessary to kill a rabbit. In seeking the active principle, the author took up the extract with acidulated water and treated it with ammonia, which gave a viscous product capable of reducing iodic acid, a violet precipitate with molybdate of sodium, and an orange color with nitric acid; briefly, it offered the reactions of morphine. This is the first time, so he believes, that morphine has been obtained from plants other than papaver. After extracting the morphine, another substance remained which gave a yellow precipitate with phospho-molybdate. It appeared to be a glucoside. Mr. Bardet is now studying it.

MYRTACEÆ.

Myrtus Cheken—Proximate Examination of the Leaves.—Fritz Wein has subjected cheken leaves to proximate examination, with the result of obtaining, besides unimportant constituents, a volatile oil, three well-defined crystalline bodies—*chekenon*, *chekenin*, and *chekenetin*—and an amorphous bitter principle. The

Volatile Oil of Cheken, which was obtained to the amount of about one per cent., is thin liquid, light greenish-yellow, and has a pleasant odor reminding of eucalyptus and sage. Its reaction is neutral; sp. gr. 0.8795 at 15° C.; miscible in all proportions with absolute alcohol, ether and chloroform; soluble in 18 to 20 parts of 90 per cent. alcohol. On evaporation it leaves a resinous residue amounting to about 3.5 per cent., but no separation of a solid body is effected by refrigeration. By fractioning this oil it was found to be composed of 75 per cent. of *pinen* ($C_{10}H_{16}$), b. p. 156° to 157° C.; 15 per cent. of cineol ($C_{10}H_{18}O$), b. p. 176° C.; and about 10 per cent. of higher boiling (220° to 280° C.) constituents, which require further examination. The water distilling over with the oil contained certain volatile organic acids, among which formic, and particularly acetic acid, were clearly determined. The leaves, deprived of oil, yielded about 15 per cent. of solid extract, from which the other constituents of cheken leaves were separated. The first of these,

Chekenon, crystallizes from alcohol in the form of well-formed six-sided prisms, having a faint yellowish color, and being odorless and tasteless; soluble in hot alcohol, ether, chloroform, benzol, and glacial acetic acid; insoluble in water. The analytical data obtained by the author lead to the formula $C_{40}H_{44}O_8$.

Chekenin, which appears to be intimately associated with the bitter principle, was obtained pure by fractional crystallization from alcohol. It constitutes faint yellowish, odorless and tasteless rhombic plates, which are readibly soluble in hot alcohol and ether, but with difficulty in cold alcohol, glacial acetic acid, benzol, and petroleum ether; very sparingly soluble in hot water, from which it separates in unchanged form. Melting point 224°–225° C.; sublimable, unchanged by careful heating a little above the melting point. The elementary analysis leads to the formula $C_{12}H_{11}O_3$.

Chekenetin was obtained only in very small proportions. As obtained by the author, it constitutes well-formed crystals, which are with difficulty soluble in alcohol and ether, and have a composition corresponding to the formula $C_{11}H_7O_6+H_2O$.

Cheken bitter is an extremely bitter amorphous body, remaining from its solutions as a brown, translucent, not completely dry and tough mass, and having an unpleasant odor. It is easily soluble in alcohol, ether, chloroform, aqueous alkaline solutions, but not in pure water or in petroleum ether. Its condition pointed to impurities, hence the author has made no elementary analysis of cheken bitter, but he has determined the absence of nitrogen. It is not a glucoside, and does not appear to be entirely devoid of toxic properties.—Arch. d. Pharm., Aug. 1888, 665–682.

LEGUMINOSÆ.

Senna—Solubilities of Different Sorts of Commercial Powder.—Charles Heisch has examined some samples of powdered senna, believed to be adulterated, together with sample of known quality. The result, as far as the solubility of these samples in different menstrua is concerned, the character of the ash, etc., may be useful for future reference, and is given in the following table:

No.	Kind and Source.	Total.	Sol. in Water.	Sol. in HCl.	Insoluble.	Alkalinity as K_2O.	Alcoholic Extract of Ash and Water free.
1	Tinnevelly, Brown and Smart.	11.48	2.4	8.86	.2	1.16	30.
2	Same powdered	11.22	2.31	8.77	.1	1.14	29.9
3	Tinnevelly, Apothecaries' Hall	11.34	2.35	8.72	.2	1.16	33.19
4	Same powdered.	11.39	2.67	8.31	.4	1.06	31.78
5	Powdered Alexandrian, Brown and Smart	11.69	2.35	7.86	1.49	.84	33.3
6	Alexandrian Apothecaries' Hall	11.64	2.91	8.36	.37	1.06	29.04
7	Ditto in powder	11.35	2.66	7.98	.60	2.06	30.13
8	Alexandrian, Allen and Hanbury	12.36	2.96	9.02	.38	1.54	35.5
9	Same powdered	12.54	3.18	9.12	.24	1.76	35.41
10	Powder from Allen and Hanbury, believed to be mixed	13.98	1.22	11.91	.85	1.69	27.75
11	Powder No. 85, from Hampstead	19.01	3.01	12.86	3.14	1.22	29.55
	Ditto No. 88, ditto	12.89	2.48	9.05	1.36	1.25	30 00
12	Buchu leaves	6.06	2.73	3.25	0.07	1.47	17.49

It will be observed that the suspected samples obtained from Messrs. Allen and Hanbury contain considerably more ash than the others, and with one exception yield more extract. The results obtained with buchu leaves are added, because of the suspicion that buchu is sometimes used as an adulterant.—Amer. Jour. Phar., Sept. 1888, 460–461; from the Analyst, Aug. 1888.

Cassia Tora—Proximate Analysis.—W. Elborne has subjected the seeds of *Cassia Tora* to proximate analysis. The seeds and the leaves of the same plant are used in India as a remedy for ring-worm and other skin diseases, and Dr. Dymock has suggested that they may contain chrysophanic acid. In Mr. Elborne's opinion, their medicinal activity is due to a substance which he describes as resembling emodin. From the alcoholic extract he states that he obtained a glucoside, which he calls "potential emodin;" but this view is rather conjectural than the result of satisfactory experiment, and evidently requires further investigation. —Yearbook of Pharm., 1888, 383–387.

Moussena—A New Tapeworm Remedy.—The bark of an Abyssinian tree, designated by Baillon as

Acacia anthelmintica, and known under the name of Moussena, enjoys quite a reputation in its native country as a tapeworm remedy. It is given in doses of 40 to 60 grams, mixed with milk or honey, and is said to be more efficient than kousso, and also more pleasant to the taste. Thiel has isolated from this bark a substance which he has named

Moussenin, which appears to be closely related to saponin.—Arch. d. Pharm., May 1889, 470; from Jour. de Pharm. et. de Chim., 1889, xix. 67.

East Indian Gum—Origin of the different Kinds.—I. G. Prebble communicates some information respecting the origin of the East Indian gums and their names, recently described (see Proceedings 1888, 388–390). The term "Ghâti" is a purely Indian word, and has the primary meaning of a strait or a pass through a mountain. The term is sometimes applied to the local vegetable productions to distinguish them from those obtained from abroad or from a distance. The best picked "ghâti" gum, as now exported from Bombay, is almost entirely derived from *Anogeissus latifolia.* The Bombay name is "daura" or "dabria." "Oomrawuttee" gum derives its name from Oomrawuttee, or Amravti, the chief town of the Hyderabad assigned districts, known as the Berars. It is considered by the native gum dealers in Bombay to be of two kinds, the "ghâti," and the "amrad"; the latter they consider to be derived from the babool tree, *Acacia arabica.* This babool gum is distinguished from all other gums that the author has examined, by being unaffected by either neutral or basic acetate of lead, and by being more or less darkened, but not gelatinized, by ferric chloride. As to the name "amrad," the author considers it likely that it is a word imported into India, possibly a corruption of the Arabic word "hamra," red, and this is supported by a recent statement that "amrad" is a corruption of "amhara," a name applied to a gum derived from an acacia. Gums are sent to Bombay from all parts of India, but the best come from Amravti. Other centers are Nagpur, Jubbnepur and Cawnpur, and a good deal is collected on the "ghàti" of the Bombay Presidency. On arrival in Bombay they are sorted, the anogeissus gum ("Ghati"), possessing well marked physical characters, being easily separated and sent to the London market almost free from admixture. The "amrad" gums are generally a mixture of various gums, babool gum predominating.—Phar. Jour. and Trans., July 7, 1888, 1.

Gum Arabic—Present Condition of the Market.—At a recent meeting of the Paris Pharmaceutical Society, Mr. Petit called attention to the numerous and strange varieties of gum now to be found in the market. In appearance they will pass and do sell readily for gum Arabic or gum Senegal, and, indeed, they answer for most purposes. But when the classic tests are applied to them they are quite bewildering. Alcohol, for instance, will not precipitate them when added in the usual proportion, and ferric salts will fail in many cases to produce the characteristic coagulation. Hence assays of preparations containing gum have become liable to suspicion; no analyst would like now to declare for certain that a specimen of gum syrup, for example, does not contain the quantity of gum it should. Gums reaching our markets at present have so strange a

chemical behavior that new investigations on the subject are quite necessary. Mr. Bourguelot added that he had of late examined specimens of gum with the polariscope, and noticed that their refractive power was most variable and often quite different from what we were accustomed to find it.—Amer. Drugg., Jan. 1889, 5.

Powdered Gum Arabic—Adulteration with Rice Starch.—John Henry Wilson having his attention drawn to the unusual whiteness of a lot of emulsion of cod liver oil, and noticing the formation of a white precipitate, on diluting a portion of the emulsion, was led to subject his powdered gum Arabic to examination. He found that it would not dissolve in water completely until heated to boiling, and that the solution then gave the characteristic reaction of iodine with starch. Under the microscope its identification was attended with some difficulty, but it was finally determined to be rice starch, and that it was present in the sample to the extent of 15 per cent.—Pharm. Jour. and Trans., June 1, 1889, 969–970.

Artificial Gum Arabic—Preparation.—According to "Revue Scientifique," an artificial gum arabic may be made by boiling 20 parts of sugar with 7 parts of fresh milk, adding 50 parts of a solution of 36 parts of silicate of soda in 100 parts of water, and heating to 50° C. (122° F.). The mass is then poured into tin receptacles, and granulated masses resembling gum arabic deposit by degrees.—Amer. Jour. Phar., October 1888, 510.

Astragalus mollissimus—Botanical and Chemical Characters, etc.—James Kennedy contributes an interesting paper on a Texan plant, *Astragalus mollissimus*, which appears to be one of the poisonous plants popularly known in the western and southwestern part of the United States as

Loco Weed.—The botanical characters of this plant are briefly as follows: An herbaceous perennial from 8 to 12 inches in height, its numerous branches being closely crowded upon exceedingly short, decumbent stems. The leaves are compound (oddly pinnate) alternate, with long and pointed stipules. The leaflets are elliptical, with entire margin, pubescent, and less than one inch in length. The flowers, which are of a purplish color, are sessile upon a common peduncle of considerable length. The peduncles are rather large, and arise from the axils of the leaves; calyx five-toothed, inferior. Corolla papillionaceous, long and narrow. Stamens 10, diadelphous (9 and 1); pistil 1; ovary 1; two-celled; ovules numerous. At the base of each flower is a small bract.

The green plant loses about 80 per cent. of its weight in drying; yields, calculated for the dry plant, 30.6 per cent. to cold water; the residue, to alcohol, 1.7 per cent., and to ether, .09 per cent. It contains a peculiar organic acid, gum, coloring matter, tannic acid, extractive, two resins, and chlorophyll; by distillation a trace of volatile oil was obtained. The dried plant yields 20 per cent. of ash, consisting of mag-

nesium sulphate, sodium chloride, aluminia, silica, and a trace of iron. The *organic acid*, which appears to be volatile, has been obtained only in minute quantities. It is a powerful reducent of copper salts, amorphous, faint yellow in color, and almost insoluble in alcohol.

Physiological experiments made by Dr. B. F. Kingsley, which are given in some detail, lead the author to the conclusion that this "loco" is a non-poisonous plant. Moreover, there is no evidence that it has ever caused the death of animals, and it evidently *does not* possess the properties ascribed to it by local superstition.—Pharm. Rec., July 2, 1888, 198.

Catechu—Collection, etc. in Burmah.—The "Rangoon Gazette," discussing the manufacture and trade in cutch in Burmah, says the export of cutch is the next most important to that of rice, and it has been steadily increasing during the past twenty years. The Acacia Catechu, or cutch tree, is found in large forests throughout the whole country; the core of the tree is a dark red wood like mahogany; the wood is chipped and boiled, the inspissated extract thus obtained being the cutch. In October the cutch boilers form themselves into small companies, and select a spot where there are good robust trees. The boiling pans are firmly fixed in holes in the ground, the trees are felled, the branches lopped, the bark and outer wood removed, and the core reached. The children chip the dark red wood, which is placed in the pans with a little water, care being taken that it does not get overheated or burnt. When of the required consistence, the contents of the pans are spread out on mats to evaporate, the woody refuse being thrown away, and the sap alone retained. In a short time the mats can be manipulated into small blocks of a regular size. The colors are red, dark red, or black, the shades depending principally on the quality of the chips and the time taken in boiling. The light red and red cutch is considered the best, and with betel nut and other ingredients, is chewed by the Burmese, and is exported to India for the same purpose. The dark red and black are prepared largely for the markets of Europe and America. The characteristics of pure, unadulterated cutch are uniformity of appearance, bitter, acrid or pungent taste, smell like opium, and friability. Formerly the quality could as a rule be relied on, but of late years, owing to the steady demand, keen competition, and enhanced prices, a stimulus has been given to the trade, and great liberties have been taken with the cutch in mixing and adulterating. A spurious cutch is used; fibrous matter, sand, or earth are sometimes added to increase the weight, and the Chinese dealers have a habit of putting good, bad and indifferent into one consignment, which is then sold for a good sample.—Amer. Drugg., Dec. 1888, 227; from Chem. and Drugg.

Catechu—Medicinal Value of Commercial Samples.—Edwin Stanton Reider records the results of the examination of eighteen commercial samples of catechu, undertaken with a view to ascertain the medicinal

value of the commercial drug. Summing up his results, the author finds that the catechu generally present in the drug market contains small proportions of catechin and correspondingly large amounts of impurities; almost invariably contains iron, and, as far as these results indicate, none has been found to contain potassium bichromate, as has been sometimes alleged.

Following is a general synopsis of the results obtained:

Sample.	Moisture.	Ash.	Catechin.	Remarks.
1	10.16 per cent.	3.77 per cent.	3.73 per cent.	Iron, trace; aluminium, trace.
2	10.30 "	13.35 "	4.60 "	Iron, considerable; aluminium, trace.
3	14.18 "	3.10 "	7.20 "	Iron, trace.
4	9.57 "	2.99 "	2.60 "	Iron, trace.
5	13.14 "	5.83 "	1.53 "	Iron, trace.
6	12.44 "	4.31 "	4.20 "	Iron, trace.
7	14.47 "	1.67 "	2.40 "	Iron, trace.
8	9 12 "	2.39 "	5.40 "	Iron, trace.
9	15.13 "	4.88 "	1.20 "	Iron, considerable.
10	14.14 "	2.18 "	5.20 "	Iron, slight trace.
11	12.15 "	6.82 "	16.50 "	Iron, trace.
12	9.47 "	2.40 "	3.00 "	Iron, slight trace.
13	13.13 "	4.62 "	4.80 "	Iron, slight trace.
14	7.99 "	19.61 "	2.20 "	Iron, considerable.
15	8.57 "	3.88 "	3.00 "	Iron, trace.
16	12.00 "	5.88 "	3.80 "	Iron, considerable.
17	10.82 "	5.04 "	1.00 "	Iron, trace.
18	13.57 "	3.08 "	2.80 "	Iron, very slight trace.

—Amer Jour. Phar., April 1889, 165–167.

Kino—Examination of Commercial Samples.—Chas. H. Breidenbach has examined five samples of Malabar kino and four samples of powdered kino, of which F and G were odorless and had a red-brown color, while H and I had a slight aromatic odor and a very dark-red grayish-brown color, and yielded a gray-brown ash, that of the other samples being white. The results are as follows:

Samples.	Per cent. of		Per cent. Soluble in			
	Moisture.	Ash.	Ether.	Absolute Alcohol.	95 p. c. Alcohol.	Water.
A	11.27	1.37	.81	96.70	93.22	68.20
B	12.50	1.28	.43	97.65	93.50	69.32
C	10.79	1.42	.56	98.00	94.28	67.45
D	13.45	1.32	.67	92.56	90.72	70.90
E	12.92	1.20	.85	94.68	92.16	68.85
F	11.25	1.25	.74	96.24	92.50	68.76
G	12.62	1.34	.63	95.72	91.60	72.17
H	16.78	2.80	.25	99.00	97.42	55.72
I.	17.92	2.50	.29	98.80	96.00	58.16

The ether soluble portion dissolved readily in alcohol, and this solution gave, with ferric chloride, a deep green color. The portions insoluble in absolute alcohol yielded from 65 to 92 per cent. to water, except forH and I, which residues were completely insoluble in water. Of the same two samples the residues left by water treatment yielded to alcohol 98 per cent., while the corresponding residues of the remaining seven samples contained between 77 and 90 per cent. of alcohol-soluble matter.—Amer. Jour. Pharm., Feb. 1889, 70–71.

Loco-Weeds—Review of the Literature upon Them, etc.—Prof. Fred'k B. Power, referring to Prof. Sayre's paper on "Loco-Weed," communicated to this Association at the Detroit meeting (see Proceedings 1888, 106), in which he fails to find record of some of the earlier observations on the plants known as "loco," reviews the literature upon the subject of these interesting plants. Prof. Power observes, that while the histological examination of "loco" plants has recently been undertaken by a very able botanist, it is very desirable that the subject should be further pursued in a chemical direction. It is to be regretted that Prof. Sayre, in his above-mentioned paper, omitted to note the methods of analysis pursued by him, since by this means the "importance of scientific investigation" would have been much more clearly demonstrated.—Pharm. Rundsch., June 1889, 135–137.

Indigo—Manufacture in Manchuria.—A correspondent of the "Chinese Times" gives the following account of the manufacture of indigo in Manchuria: The plant, probably *Polygonum chinense*, flowers in August, when it is cut down and immediately subjected to process. The method is sometimes extremely simple, the only thing visible being a round pit dug in the ground. Generally, however, there are four such pits; one is simply a water pond, called the *shui y' ao;* two of equal size, parallel to each other, are called *tien ch' ih;* another curved tank is called the *k' ung chih.* In addition there is usually a large wooden trough, called *shui kuei*, placed between the parallel vats. The latter are filled with the stems and flowers of the plant, covered with water conveyed by aqueduct from the pond, and infused for twelve hours. The liquor is then transferred into the wooden trough, lime is added, and the contents are violently agitated for some time by being beaten with a shovel-shaped implement called the indigo-rake. This being completed, the liquor is poured into the curved tank, which is faced with mortar, and is allowed to settle; the clear water is drawn off, the pulpy sediment carefully removed, and in this condition put into boxes and sold to dealers in Shanghai and other southern ports, where the manufacture is completed. Hundreds of thousands of catties of indigo are turned out in this primitive way.—Amer. Drugg., Aug. 1888, 154; from Br. and Col. Drugg.

Indigo—Analysis of Stem Ash.—John Tsawoo White reports an analysis of the stem ash of Indigo ferra tinctoria. The ash was prepared by heat-

ing the dry stem, after peeling off the bark, on a large sheet of platinum-foil over an argand flame at as low a temperature as possible. The gray ash was weighed, powdered, and put into a stoppered bottle. 1614 gms. of the stem gave 29.4 gms. of ash, equal to 1.8 per cent. The ash determination is given below. The analysis was conducted according to Fresenius.

	I.	II.
Charcoal	4.76	——
Sand	9.99	——
CO_2	8.95	10.56
SiO_2	7.21	8.51
SO_3	5.31	6.27
Fe_2O_3	4.58	5.41
P_2O_5	10.37	12.24
CaO	16.40	19.36
MgO	9.86	11.64
K_2O	16.12	19.03
Na_2O	4.00	4.72
NaCl	1.91	2.26
	99.46	100.00

The numbers in column II. are obtained from those in I. by cancelling charcoal and sand, which are regarded as unessential, and calculating the percentage of the rest.—Chem. News, May 24, 1889, 244.

Coronilla scorpioides—Isolation of Bitter Principle from the Leaves.—Schlagdenhauffen and Reeb have separated from the leaves of *Coronilla scorpioides* a bitter principle, *coronillin*, to which they assign the formula $C^{11}H^{12}O^{6}$. It is a yellowish powder, soluble in water, acetone and amylic alcohol; slightly soluble in chloroform and ether. Heated with diluted hydrochloric acid an amorphous resin is separated, to which the authors give the name of coronillein. This also occurs as a yellow powder, but is not bitter to the taste. It is insoluble in water, but dissolves in alcohol, acetone and chloroform. Coronillin, say the authors, is a heart poison; coronillein has no perceptible physiological action.—Amer. Jour. Pharm., Feb. 1889, 81; from Nouv. Rem., Dec. 24, 1888.

Vicia Faba, Lin.—*Medicinal Use of the Flowers.*—Dr. Bouloumié draws attention to the flowers of the horse bean, (*Vicia Faba*, L.,) which constitute a popular remedy in some parts of France. He has verified their good effects in sub-acute nephritic colics with uric and phosphatic gravel, and in the pains symptomatic of renal calculus; also in a case of urethral pains from enlarged prostate. He failed to relieve in a diabetic case of acute nephritic colic. The dose is 50 or 60 flowers per cup of water, two cupfuls to be taken at beginning of pain.—Amer. Jour. Pharm., Aug, 1888, 404; from Bull. de la Soc. Méd. Prat., May 31, 1888.

Soya hispida—Value as Food.—Lecerf describes this leguminous plant of Asiatic origin—now cultivated in Austro-Hungary—which possesses more proteic substances, phosphoric acid, potash and fatty matters, than any other vegetable growth, and contains but 3.21 per cent. of amylaceous and saccharated products. The analysis gives: Water, 9.37; proteids, 36.63; fats, 17.00; ac. phos., 3.16; potash, 1.47. The Asiatics prepare a sort of milk from it which the Chinese make into cheese. The Japanese convert it into an alimentary liquid which they call shoyu. Bread made from it keeps fresh for several days. Dr. Dujardin-Beaumetz exhibited a sample of the latter at the Acad. de Méd., May 29th, and recommended its use for diabetic patients.—Amer. Jour. Pharm., Aug. 1888, 405; from Arch. de Phar., July 5, 1888.

Ground-Nuts—Cultivation in China.—According to a Consular report, ground-nuts are best grown in a soil of coarse sand and mud. They should be set deep, and the ground pressed down firmly over them. The ground is ploughed about April, and trenches dug about 10 inches apart, into which ashes, lime and rubbish are thrown. The seeds are sown 10 inches apart, and as each is put in, the sides of the trench are turned over it with the foot and stamped down firm. Every ten days or so the ground is weeded, and in about two months the sprouts are sufficiently long, and are sprinkled with liquid manure. In four months they come into flower; the flower-stalk then bends over, and, as the flower falls off the flower-stalk buries itself in the ground, and produces seeds, ground-nuts, which become ripe about the Shuangchiang festival (October 23). When the harvest, however, takes place after this date, more oil can be got, and a better price obtained for it. Ground nuts are harvested by ploughing them up with an ox-plough, when the stalks and seeds clinging to the plough are gathered into a heap. For the remainder, which are still left in the ground, two men sift the earth with a large bamboo sieve. The pods are dried perfectly dry in the sun, until the thin skin which covers the seed can be broken by rubbing, when they can be stored. If they are not quite dry, they shoot again and are useless. Oil is pressed from ground-nuts, and the refuse made into ground-nut cakes; 40 lbs. sown to an acre yield about 666 lbs.—Phar. Jour. and Trans., Dec. 22, 1888, 492.

TEREBINTHACEÆ.

Rhus glabra—Proximate Examination.—Joseph A. Paten has subjected leaves of *Rhus glabra* growing on the bluffs bordering the Mississippi River near Dubuque, Iowa, to proximate examination, two lots of leaves, collected in July and August, being used. The object being mainly to determine the tannin, separate estimations were made by precipitating the decoction of the leaves with gelatin, and multiplying the weight by 0.54. The July lot yielded 16.36 per cent., the August lot 15.75 per cent. The tannin strength of both samples is practically alike, but is not

so large as that of sumac leaves from Virginia, which yield from 20 to 25 per cent. The general analytical results are tabulated as follows:

	July.		August.	
Petroleum extract	. . .	5.72	. . .	5.12
Volatile oil	.2	. . .	.1	. . .
Wax	1.5	. . .	1.22	. . .
Fats	4.02	. . .	3.8	. . .
Ether extract	. . .	5.6	. . .	4.85
Of which soluble in water	1.3	. . .	1.55	. . .
Alcohol extract	. . .	14.3	. . .	13.6
Tannin	10.8	. . .	10.1	. . .
Altered tannin, resin, etc	3.5	. . .	3.5	. . .
Water extract	. . .	10.92	. . .	12.15
Glucose	.87	. . .	.63	. . .
Cane sugar	.18	. . .	.21	. . .
Other carbohydrates	3.04	. . .	4.2	. . .
Mucilage	4.78	. . .	6.35	. . .
Extracted by soda	. . .	13.29	. . .	12.05
Albuminoids	6.21	. . .	5.6	. . .
Extracted by HCl	. . .	4.72	. . .	5.54
Calcium oxalate	3.36	. . .	3.87	. . .
Treatment with Cl (hydrocellulose)	. . .	6.72	. . .	9.17
Treatment with HNO_3 (incrusting matter)	. . .	1.41	. . .	3.76
Moisture	. . .	4.6	. . .	4.4
Ash	. . .	.34	. . .	.34
Residue	. . .	25.2	. . .	27.84

The coloring matter, which is present in small amounts only, is probably alike with that of quercitron bark.—Amer. Jour. Pharm., Aug. 1888, 389–390.

Hedwigia balsamifera—Chemical and Physiological Examination.—Messrs. Gaucher, Combemale and Mareslany describe this plant growing in the Antilles. The authors tested its physiological effects with extracts from the bark of both roots and stems, given hypodermically to guinea-pigs. It caused rapid and considerable lowering of temperature; progressive paralysis; generalized convulsions; pupilar dilation; vaso-dilator phenomena; and, in mortal intoxication, respiratory irregularity and cardiac paresis. They found it to be a nerve poison, hypothermic, paralyzing and spasmodic, affecting the medulla. The extract was observed to contain an alkaloid and a resin, the former being more especially a convulsivant and the latter a paralyzing agent. The resin appears to be more active than the alkaloid. Apart from its antithermic qualities, the extract seems to act like curare.—Amer. Jour. Pharm., Nov. 1888, 565; from L'Union Méd., Oct. 6, 1888.

RHAMNACEÆ.

Rhamnus Frangula and R. Purshiana—Chemical Examination of their Barks.—Paul Schwabe reviews the results of the chemical examinations

of frangula bark by different experimenters, and enumerates the different principles described, viz.: the *rhamnoxanthin* of Biswanger and of Buchner; the *frangulin* and *nitrofrangulinic acid* of Casselmann; a principle analogous to *cathartic acid*, a glucoside *avornin*, and the acid and resinous products of the splitting up of the latter, of Kubly; the recognition by Faust of the *avornin* of Kubly as being identical with the *frangulin* of Casselmann and the consequent designation of the acid product of decomposition as *frangulic acid;* the presumption of Liebermann and Waldstein that frangulic acid is identical with *emodin* (*trioxymethylanthrachinon*); and, finally, the studies of E. v. Keussler, who disputes the identity of frangulic acid with emodin, and recognizes it to be *trioxyethylanthrachinon*. The author gives the course of his experiments in detail, and establishes beyond dispute the presence of *emodin* in frangula bark, together with smaller quantity of *frangulin*, the yield being 0.04 per cent. of the latter, and 0.1 per cent. of emodin. No other crystallizable body was separated, notwithstanding the author's exhaustive experiments and research for such, and he therefore regards them as the exclusive crystalline constituents of *old* frangula bark; for it is a remarkable observation—already pointed out by Casselmann—that *fresh* frangula bark does not yield either of these crystalline compounds, which therefore appear to be formed during the storage of the drug. Mr. Schwabe confirms essentially the characters given by Casselmann and by Faust to the

Frangulin obtained by them. It constitutes when dry a handsome light yellow, somewhat silky-glistening, friable mass, showing crystallinity under the microscope; is, when pure, almost insoluble in water and in ether, but more soluble in boiling chloroform, benzol and alcohol, and freely soluble in glacial acetic acid, from which it is again completely deposited on cooling. It melts at 228° to 230° C. The elementary analysis leads to the formula $C_{21}H_{20}O_9$. By the action of alkalies, or acids, it is split into emodin and non-fermentable sugar. The analysis of the emodin (otherwise known as frangulinic acid), as well as of its bromine and acetyl compounds, proves its identity with the emodin from rhubarb completely. Operating upon the bark of *Rhamnus Purshiana* (Cascara sagrada) in the same manner as upon *R. frangula* bark, the author also obtained emodin, but failed to obtain frangulin. It seems probable that the latter body may also be formed in the cascara bark upon prolonged exposure of the same, as appears to be the case with frangula bark. He regards his emodin from cascara bark to be identical with the crystalline body described by W. T. Wenzell, and erroneously regarded by the latter to be a glucoside.—Arch. d. Pharm., July 1888, 569–594.

Cascara Sagrada—Collection Out of Season.—John Moss draws attention to cascara bark, forwarded to him as occurring in the New York markets, which showed evidence of being spurious, or as seems probable, of being collected out of season. Instead of its constituting handsome

quills, it was in irregular pieces, evidently cut from the tree with knives, or scraped from the twigs. In the case of one sample the larger pieces were, perhaps, as much as ten inches in length, but generally they were much smaller, and from one-thirteenth to one-sixteenth of an inch thick. Thin pieces of silvery white wood are adherent in places, showing that the bark was incapable of being stripped at the time of collecting, and had to be cut away. The odor and taste also were less strong than those of the ordinary cascara bark, and it is evident that this sample, while true cascara bark, was collected out of season. The other sample, described by the author as spurious cascara, presented similar characters, but consisted of bolder quills and in curved pieces, the former as much as 5 inches long, the latter irregular as to size, but somewhat thicker than the quills, which are not over one-twentieth to one-sixteenth of an inch thick. The collective odor is suggestive of cascara, but is slightly sharper and more aromatic. The author is inclined to think that this kind, also, is true cascara bark collected out of season.—Pharm. Jour. and Trans., Feb. 16, 1889, 649–650.

Cascara Sagrada—Causes of Unsatisfactory Condition of the Bark, etc.—A paper by F. A. Beckett throws some further light on the causes that have in the past few years determined the unsatisfactory character of cascara bark of the market. He says that three species of this bark are found on the Pacific slope, namely: *Rhamnus Purshiana*, *Rhamnus californicus*, and *Rhamnus Crocca*, all commonly known as cascara sagrada, sacred bark, and chittem bark. The first two are best known, and are gathered indiscriminately; are almost identical in appearance, and each is equally good. *Rhamnus Purshiana* is found in Oregon and in the northern part of California. *Rhamnus californicus* is the California species, and is that which was named sacred bark by the old Spanish settlers. The high price ruling at the present time is an inducement to the gatherers to furnish an immediate supply, in response to the pressing demand; and as nothing better is to be had, there has already been offered and sold large quantities of old and inferior bark of little therapeutic value. In addition to this, there has also been placed on the market as a substitute or adulterant a quantity of a species of alder bark, which, although similar in appearance and taste to the cascara, is of no value whatever as an aperient. It has been suggested that another substitute is buckthorn bark, but the California buckthorn is really none other than the cascara. The varying differences in the appearance of cascara sagrada bark are due mainly to the influences of the climate of the locality where the bark is grown, and the time of gathering; much of it coming from Oregon is moss covered, while most of the California bark—particularly the small quill—has a clean, smooth epidermis. The season for collecting varies according to locality, but the time should be as soon after the rains as circumstances will permit. The bark is then quite rich in extractive mat-

ter; it does not cling to the wood, but can readily be peeled off, and curls up in the quill-form as commonly found. If the time of gathering is properly chosen, it is said that the large bark of the trunk, and that taken from the surface roots, is just as desirable as the quill bark from the smaller branches. After the sap passes out of the bark it ceases to peel, and in time becomes old and clings to the wood—the technical term for which is that it becomes "hidebound." The knowledge of this condition is of considerable value to purchasers, for when collected at this time the bark has to be taken from the tree with a draw-knife, portions of the wood being shaven off at the same time, and as found in the market it is in flat-broken pieces, with a small portion of wood on the inner surface. As has already been stated, the bark should be gathered very soon after the cessation of the rainy season; the time, therefore, best suited is between the months of April and July, according to locality. The medicinal qualities of the bark are greatly enhanced by allowing it to age after gathering; and to obtain the best therapeutic effect, it should not be used until it has become (after being collected) at least a year old. Most of this is now in the hands of the manufacturers of pharmaceutical preparations, who, well aware of the value of bark thus matured, will not be likely to offer much for sale in its natural state. It is difficult to estimate the quantity of this reserve stock, although three or four of the leading manufacturers are believed to have on hand from five to twenty tons each. Of the fresh bark there is every probability that there will be an unlimited supply, as the result of the present demand and prices.—Pharm. Era, April 1889, 132.

Rhamnus Frangula—Use in Odontalgia.—Dr. Gretchinsky makes a decoction of frangula bark by boiling 15 to 30 gm. in 2 tumblers of water. Patients are directed to rinse the mouth with this every five minutes until the pain ceases; and then every two hours. Cavities may be filled with cotton dipped in the fluid.—Répert de Ph., Nov. 1888; Amer. Jour. Pharm., Jan. 1889, 16.

CELASTRINEÆ.

Euonymus atropurpureus—Analysis of the Root and Bark.—Frank V. Cassaday has made a complete proximate analysis of the root bark of wahoo, and gives the details of his experiments, and the following summary of his results:

Volatile oil and wax	1.30	per cent.
Euonic acid and resin	1.48	"
Euonymin and resin	2.16	"
Mucilage	1.50	"
Dextrin	5.53	"
Saccharose	1.88	"
Albuminoids and pectin	8.34	"

Calcium oxalate	1.20	per cent.
Coloring, etc., extracted by chlorine water	6.66	"
Ash	11.65	"
Moisture	9.25	"
Cellulose, lignin and loss	49.05	"
Total	100.00	

Respecting the isolation of the two active principles—*euonic acid* and *euonymin*—the author remarks that the bark should first be exhausted with ether to extract euonic acid, and then with alcohol to obtain euonymin. The method used by Carpenter and Wenzell, of making a tincture with diluted alcohol and agitating with chloroform, was also tried on a much larger quantity of the drug, but in this way mixtures of the two principles were obtained, which would account for Carpenter stating that the active constituent was crystalline with a bitter taste, as he, no doubt, had the crystals of euonic acid mixed with the very bitter euonymin.—Amer. Jour. Pharm., June 1889, 284–285.

EUPHORBIACEÆ.

Euphorbia pilulifera—Proximate Examination.—James Hicks Bunting has subjected *Euphorbia pilulifera* to proximate examination, with the following results:

SOLVENTS AND PER CENT.	REAGENTS, ETC.	CONSTITUENTS, ETC.
Petroleum spirit. Amount dissolved, 2.06 per cent.	Soluble in absolute alcohol. Soluble in 95 per cent. spirit. Residue from treatment with alcoholic potash.	Vegetable wax. Chlorophyll. Caoutchouc.
Stronger ether. Amount dissolved, 1.36 per cent.	Non-volatile principles, 0.56 per cent. Ferric chloride. HCl and dil. H_2SO_4. Dried extract treated with absolute alcohol and water added. Reagents for alkaloids and glucosides. Volatile principle, 0.80 per cent.	Tannin. Chlorophyll. Resin. No change. Volatile acid.
Absolute alcohol. Amount dissolved, 1.13 per cent.	Gelatin. Dissolved out of dried extract by absolute alcohol and treated with water, etc. Reagents for alkaloids and glucosides.	Tannin. Resin and Chlorophyll. No change.
Distilled water. Amount dissolved, 10.9 per cent.	Precipitated by alcohol, 6.13 per cent. Incineration.	Veg. mucilage, 2.6. Sugar, 0.6. Other carbohydrates, 4.1 Ash, total amount, 4.77.
Water with .2 per cent. sodium hydrate Amount dissolved, 2.6 per cent.	Precipitated by alcohol, 2 per cent. By incineration.	Mucilage and albuminoids. Ash, 0.6 per cent.
Water with 1 per cent. hydrochloric acid. Amount dissolved, 5.8 per cent.	Precipitated by NH_4HO as Ammonium oxalate. By incineration.	Calcium oxalate 2.04 per cent. Ash, 3.4 per cent.
Chlorine water. Amount dissolved, 15.96 per cent.	Dissolved out by chlorine water. Residue.	Lignin. Cellulose, etc.

Undissolved residue, 60.19 per cent.—Amer. Jour. Pharm., Nov. 1888, 552–553.

URTICACEÆ.

Celtis reticulosa—Occurrence of "Skatole" in the Wood.—Prof. W. R. Dunstan has isolated from the wood of *Celtis reticulosa* a crystalline substance which proved to be identical with "skatole," (see under "Organic Chemistry,") the substance to which the intolerable odor of the

human fæces is due. *Celtus reticulosa* is a tree of medium size growing in Java, Ceylon and Eastern India, and it is recorded by Thwaites, that the freshly cut timber of this tree possesses a powerful and very disgusting odor.—Pharm. Jour. and Trans., June 15, 1889, 1010.

Pilea pumila—Proximate Examination.—Frank R. Weiser has subjected *Pilea pumila,* a plant which has some reputation for counteracting the effect produced by *Rhus Toxicodendron,* and which, growing from Canada to Florida, is popularly known as *clearweed* and *richweed,* to proximate examination with the following results:

Extracted by petroleum spirit (volatile oil, .26; fat, .70; wax, .28; chlorophyll, .08)	1.32
" by ether (mostly chlorophyll)	1.52
" by alcohol (glucoside, etc.)	1.00
" by water (mucilage, dextrin, sugars, etc.)	8.89
" by dilute HKO	4.90
" by dilute HCl	9.02
Lignin	3.25
Wood fibre, ash and moisture	66.33

A substance having a strong vanilla-like odor, having neither alkaloidal nor glucosidal characters, was also observed.— Amer. Jour. Pharm., Aug. 1888, 390–391.

Elm Bark—Adulteratian of the Powder.—George M. Beringer calls attention to a gross adulteration of pulverized elm bark. Surmising that the adulterant was grain of some kind, most likely corn, ground up with the bark, the smallest quantity of these samples boiled with distilled water gave with iodine an abundant reaction for starch. Pure elm bark (*liber alone*) should be free from starch. Mr. Charles Bullock examined the specimen microscopically, and detected both corn and potato starch. The potatoes were likely sliced and dried, and then ground up with the bark. The following simple test would show the deficiency of mucilage in ground elm, and the likelihood of adulteration. Ten (10) grains of pure ground or pulverized elm bark, thoroughly shaken with one fluid-ounce of water, will in fifteen (15) minutes form a thick jelly-like mass of a good fawn-color.—Amer. Jour. Pharm., Nov. 1888, 552.

Shellac—Action of Alkalies and Oxidizing Agents.—R. Benedikt and E. Ehrlich find that when shellac, previously deprived of fat by boiling with sodium carbonate, is boiled with caustic alkalis for two hours, about 70 per cent. of viscous liquid shellac is produced, which when purified by suitable means has a composition leading to the formula $C_{46}H_{12}O_{12}$. The acid value of this liquid shellac is about three times that of ordinary shellac. It readily forms soluble salts with the alkalies and alkaline earths, the latter being brittle, and, though transparent at first, soon becomes opaque. By the action of potash and potassium permanganate the shel-

lac, freed from wax, is completely converted into azelaic acid and fatty acids.—Jour. Chem. Soc., 1888, 846; from Monatsh. ix, 157.

SALICINEÆ.

Populus tremuloides—Characters of Resin from the Flower Buds.—Robert Glenk has separated from poplar buds a yellowish-brown resin, having a strong hop-like odor, and melting at 51° C. It is soluble in glacial acetic acid, acetic ether and amyl alcohol; only slightly soluble in chloroform, ether, carbon disulphide, turpentine and benzol. In alcoholic solution it has an acid reaction. It is completely soluble in a 5 per cent. solution, but not entirely in ammonia water. Oxidizing agents produce a peculiar play of color on its potassa solutions.—Amer. Jour. Pharm., May 1889, 240.

CONIFERÆ.

Russian Turpentine—Character of Acid Constituent.—According to W. Schkatelow, Russian turpentine from *Pinus sylvestris* contains about 30 per cent. of a crystalline acid, $C_{40}H_{58}O_5$, obtainable by extracting the turpentine with 50–60 per cent. alcohol and treating the granular residue with boiling alcohol, which solution solidifies to a crystalline mass on cooling. The acid is insoluble in water, soluble in alcohol, glacial acetic acid, ether, and carbon disulphide; it melts at 143°, boils at 360°, and is converted by HCl into a modification melting at 159°–160°.—Am. Jour. Pharm., March 1889, 133; from Apoth. Ztg., 1889, 99.

B. Animal Drugs.

INSECTÆ.

Cantharides—Occurrence of Partially Extracted Drugs.—Baudin has found that cantharides appear in the market, partially deprived of the cantharidin by extraction with a menstruum containing sulphuric acid; the ash then contains an undue amount of sulphate. In determining the cantharidin, he recommends it to be carried out in two stages; first exhausting with chloroform, which removes the free cantharidin, and then with chloroform containing 2 per cent. HCl, which dissolves the combined cantharidin. Cantharides contain about 1 per cent. total cantharidin.—0.72 per cent. free, and about 0.3 per cent. combined.—Am. Jour. Pharm., Jan. 1889, 21; from Apoth. Ztg., 1888, 921.

Cochineal Color—Detection in Food, etc.—For the detection of cochineal color, or carmine, in foods, E. Lagorge directs to dissolve the substance in water or dilute alcohol, and if not already slightly acid, to acidify it with 1 or 2 drops of acetic acid, care being taken to avoid a

decided excess of acid. The solution is then shaken with amyl alcohol, which extracts the coloring matter. The alcohol is poured off and evaporated with sufficient water on a water-bath. A few drops of a 3 per cent. uranium acetate solution are added to the water, and a bluish-green color or precipitate shows the presence of cochineal. The addition of an acid gives the solution an orange color. To detect it in wine the latter is shaken with a mixture of equal volumes of amyl alcohol and benzene, or, what is better, toluene, otherwise normal ingredients of the wine are dissolved and the action becomes indistinct. After shaking, the alcohol solution is poured off into a test tube, and 2 c.c. of distilled water and 1 drop of uranium acetate solution are added and the contents of the tube thoroughly shaken. A bluish-green color in the water shows the presence of cochineal. If ammoniacal cochineal has been added to the wine, the color of the lake passes from a violet red to a violet blue. Besides cochineal, some other substances give lakes with uranium oxide. Natural wine gives a yeast color, Campeachy extract gives violet, and Holland wine violet blue. The difficulty in removing the coloring matter from these wines renders the reaction with uranium acetate useless with them. —Amer. Drugg., April 1889, 73; from Chem. Zeit. and J. Anal. Chem.

Honey—Examination.—K. Kayser observes that the residue from the fermentation of pure honey is, as a rule, optically inactive, and, if heated with hydrochloric acid, it contains only exceptionally traces of reductive sugar. Sieben's first two methods for the examination of honey should therefore be modified as follows: 25 gms. honey are mixed with 12 gms. solid yeast (free from starch), and made up with water, to 200 c.c., and let ferment for forty-eight hours at a medium temperature. Aluminium hydroxide is then added, and the mixture made up to 250 c.c.; 200 c.c. of the clear filtrate are concentrated to 50 c.c., and polarized in a 200 m.m. tube. A deflection of more than 1° (Wild) proves that starch sugar has been added. 25 c.c. of the liquid used for polarizing are then mixed with 25 c.c. water and 5 c.c. strong hydrochloric acid, and heated for an hour in a boiling water-bath, neutralized, made up to 100 c.c., and any sugar formed is determined by Allihn's method in one-quarter of the liquid. The sugar thus found, multiplied by 40, gives the quantity of sugar which comes to the fermentation residue from 100 gms. of honey. If this exceeds one per cent., starch sugar has been added.—Chem. News, Aug. 24, 1888, 97; from Zeitschr. f. Anal. Chem., xxvii, Part 2.

PISCES.

Cod Liver Oil—Isolation of a New Constituent.—H. Marpman has isolated from cod liver oil a new substance, not hitherto observed, by washing the oil with 95 per cent. alcohol. The new substance is easily soluble in water, but insoluble in alcohol, ether and benzene, but somewhat soluble in hot alcohol (absolute? Rep). It has a faintly acid re-

action, rotated polarized light to the left, gave with lead acetate and with tannic acid a slight turbidity, and was not altered by potassium ferrocyanide. A dilute solution gave with ferric chloride no reaction, but a concentrated solution assumed with it a dark yellow color, which upon boiling became blood red, and again yellow upon cooling. The solution upon boiling was not changed by strong nitric acid, ammonia, or potassium hydrate. On the other hand it reduced alkaline copper solution. Upon mixing the solution with orcin and hydrochloric acid in a porcelain dish, and evaporating on a water-bath to dryness, there remained a brown residue, having a metallic lustre. This dissolved in alcohol with a dark-brown color, and the solution was colored gray-brown by ammonia. By this last reaction this constituent of liver oil soluble in water is distinguished from varieties of gum, since gum gives with orcin a green residue, that dissolves in alcohol with a greenish-yellow color, and this solution when treated with ammonia is colored yellow, with a tinge of greenish violet.

The author states that he has found this new substance in all the samples of liver oil examined, both in the white oils and in the darkest varieties, from the most diverse commercial sources. He thinks it might be present in fresh livers in larger quantity, since liver oils deposit a quantity of mucus upon standing. But at present he has not examined any perfectly fresh oils, and cannot therefore speak with certainty upon this point.—Pharm. Jour. and Trans., Oct. 13, 1888, 288; from Pharm. Centralh., Aug. 23, 1888.

Cod-Liver Oil—Extraction, etc., of two new Alkaloids.—Messrs. Armand Gautier and L. Mourgnes announce the discovery, in cod-liver oil, of several alkaloids, some of them of great activity, which appear to belong to the class of leucomaines, a class of alkaloidal bodies which are constantly being formed in the animal organism, and which the latter is constantly endeavoring to get rid of through the secretions. The authors examined both the colored and the bleached varieties of cod-liver oil, but they extracted the alkaloids which they studied from the bleached, as this is generally regarded the most active, and it seemed to the authors desirable to ascertain the cause of this activity. The particular oils used by the authors were obtained directly from Newfoundland and Norway. The authors account for the presence of alkaloids in the oil in the following manner: It is known that the fish caught under the name of cod, comprise the great cod (*Gadus Morrhua*), the dorsh (*Gadus Callarias*), and the small cod (*G. Carbonarius*); also to a slight extent, along the coasts and bays, the *Gadus Pollachius* and *G. Molva*. Their livers, after being washed and placed in vats, exude spontaneously a pale yellow or pale greenish oil, which by a species of fermentation or self-digestion (not putrefaction) becomes acid, and being in contact with the hepatic cells, becomes charged with biliary matters and acquires a yellow color.

At the same time also, certain alkaloids are dissolved by the oil, for that portion of the natural white or greenish oil which had previously exuded contains none of these alkaloids, or but traces of them.

Extraction of the Alkaloids.—The process finally used by the authors is the following: Treat 100 kilos of pale yellow cod-liver oil with its own volume of alcohol (of 33 per cent.), containing 4 gm. of oxalic acid per liter. This treatment must be thorough. The alcoholic solution is then separated, almost exactly neutralized with chalk, filtered, and the filtrate freed from alcohol in a vacuum apparatus at a temperature of 45° C. The residue remains liquid. It is digested with precipitated carbonate of calcium, and the liquid lastly neutralized by a little lime-water. The whole is evaporated to dryness in the vacuum apparatus, and the residue taken up by alcohol (90 per cent.) The alcoholic solution is distilled in a vacuum, the residue taken up by a little water, supersaturated with potassa, and then shaken with a large quantity of ether, which takes up the alkaloids. These are afterwards precipitated by adding oxalic acid to the ethereal solution. From 100 kilos of cod-liver oil, between 52 and 65 gm. of oxalates of alkaloids were obtained. The above method removes nearly the whole of the alkaloids from the oil. On dissolving the oxalates of the latter in water and adding potassa, a brown thick oil is obtained, of a strongly alkaline character. The yield may be stated as between 0.35 and 0.50 gm. of dry alkaloids per kilogramme of cod-liver oil. An examination of these alkaloids shows that they consist of volatile bases and of others which are scarcely or not all volatile. The authors classify these bases as follows:

1. Fraction boiling between 87° and 90° C. (butylamine).
2. Fraction boiling between 96° and 98° C. (amylamine).
3. Fraction boiling a little below 100° C. (hexylanine).
4. Fraction boiling between 198° and 200° C. (hydrotoluidine; a *new* base).
5. Fraction of fixed bases yielding a hydrochlorate which is immediately precipitated in the cold (aselline; a *new* base).
6. Fraction of fixed bases, yielding a rather soluble chloroplatinate, crystallizing out from the mother-water of the preceding (morrhuine; a *new* base).

In addition to these bases, the authors found in cod liver oil a little lecithine and a nitrogenized crystallizable acid, to which they have given the name *gaduinic acid.* Further reports on all the above substances are promised.—Amer. Drugg., Jan. 1889, 8–9; from Jour. de Pharm. et Chim., Oct. 1888.

Cod Liver Oil—Determination of Iodine.—Hugo Andres examines medicinal cod liver oil for iodine by mixing three grams oil with two grams dry sodium carbonate, heating to complete carbonization, lixiviating with repeated small portions of boiling water, filtering, concentrating,

adding five to six drops fuming nitric acid, and shaking with carbon bisulphide. The iodine can be estimated quantitatively by using $\frac{1}{10}$ normal sodium thiosulphate solution; the averages obtained were for pale oils 0.02 per cent., for yellow oils 0.031 per cent. The acidity is determined by dissolving 2–5 grams oil in 20 c.c. ether, adding 15 c. c. alcohol and a few drops phenolphthaleïn, and titrating with $\frac{1}{10}$ normal potassium hydrate; the acidity of the ether and alcohol must also be determined and allowed for in the test. The acid present in one gram oil neutralized from 0.002 to 0.0044 gram KOH. The author recommends that only cod liver oil containing iodine, and whose acidity does not require more than 0.004 gram KOH per gram oil be employed medicinally.—Amer. Jour. Pharm., May 1889, 249; from Pharm. Ztschr. f. Russl., 1889, 145.

Cod Liver Oil—Causes and Prevention of Rancidity.—Hyerdahl states that the rancidity of cod-liver oil does not depend upon the presence of free fatty acids, as in the case of butter, but is due to other causes, possibly to heat and exposure to air. Oil extracted from fresh livers contained from 0.3 to 0.4 per cent. free acid (calculated as oleic acid), made from livers seven days old 0.9 per cent. acid. If air be slowly drawn through fresh oil heated on a water-bath, during the first half hour there is a slight loss of acidity; if continued longer a slight increase of acids results (to 0.7 per cent. in 5½ hours). Rancidity was noticeable in all samples heated for more than 30 minutes, but the increase of acid being so slight it is impossible that this is the cause; fatty acids were liberated from a specimen of fresh oil, and these added to the oil in smaller and larger quantities; but in no case did it give the peculiar odor and taste of the rancid oil. Cod-liver oil carefully stoppered is not prone to change; specimens from 1884, 1885, 1886, 1887, showed respectively 0.37, 0.38, 0.36, 0.36 per cent. free acid. The cruder oils for medicinal and technical uses gotten through fermentation of the livers contain from 3.79 to 28 per cent. free acid, and still were free from rancidity. Fermentation produces the excessive acidity of the cruder oils. The acidity of oils obtained from the livers of various species varies decidedly:

Gadus virens, 0.17 per cent.; Brosmius brosme, 0.08 per cent.; Molva vulgaris, 4.36 per cent.; Raja radiata, 4.80 per cent.; Lamna cornubica, 2.62 per cent.—Am. Jour. Pharm., Dec. 1888, 613; from Chem. Ztg., 1888, 1475.

INORGANIC CHEMISTRY.

OXYGEN.

Oxygen—Easy Method of Preparation.—Dr. G. Denigés proposes the following easy method for preparing oxygen, which may not answer for operations on the industrial scale, but will possibly be found convenient in a pharmacist's modest laboratory. The process is as follows: In an 8 oz. matrass introduce 40 c.c. of soap-maker's soda-lye, as much water, and 2 or 3 c.c. of concentrated solution of cupric sulphate. The cupric oxide at first precipitated is re-dissolved in the excess of alkali. The blue liquor is now heated to ebullition, and the matrass, on being removed from the fire, is closed with a cork provided with two glass tubes. One is for letting out the gas, and the other, having a glass cock, contains 10 c.c. of bromine. On causing the metalloid to come down drop by drop into the blue liquor, a continuous stream of oxygen will be evolved, easily regulated by means of the bromine cock. Near the end of the operation, should the liquor become too cool, it may be necessary to heat it gently to 60° or 80° C., which is the most convenient temperature for the operation. The following represents the reaction:

$$2Br + 2NaOH = 2NaBr + H_2O + O.$$

The cupric oxide takes no direct part in the chemical changes, but acts in the same way as cobalt and nickel oxides are known to do with hypochlorites, namely, owing to simple presence. Ten c.c. of bromine, weighing 29 grammes, will, with the foregoing process, afford about 1800 c.c. of oxygen, or nearly nine-tenths of the theoretical quantity.—Amer. Drugg., April 1889, 69; from Chem. and Drugg.

Oxygen—Ready Method of Preparation from Peroxide of Hydrogen.—According to C. F. Göhring, oxygen can be prepared handily by the action of hydrogen dioxide upon potassium permanganate; 100 c.c. of the commercial hydrogen dioxide, 3 per cent., will yield about one liter oxygen. A generating flask is half filled with the H_2O_2, made alkaline by a few drops of NH_4OH, and $K_2Mn_2O_8$ is slowly added through the funnel-tube (5 c.c. of a 0.3 per cent. solution); when the reaction ceases more of the $K_2Mn_2O_8$ is added. All of the available oxgyen has been obtained if the liquid in the flask retains a red color on acidifying with sulphuric acid.—Am. Jour. Pharm., Feb. 1889, 79; from Chem. Ztg., 1888.

HYDROGEN.

Hydrogen—Ready Production in a Pure Condition.—According to Schwarz, pure hydrogen is readily and cheaply made by mixing together 22 parts of zinc dust and 22.8 parts of dry calcium hydrate (obtained by

slaking lime, sifting, and drying at 100° C.), and gently heating the mixture. Hydrogen is given off in copious quantities and very regularly. The mixture must be made freshly as required.—Amer. Drugg., Nov. 1888, 202; from Dingl. Polyt. Jour.

Hydrogen—Use of an Alloy of Zinc and Tin for its Generation.—Habermann recommends to employ for the generation of hydrogen gas, particularly when Kipp's apparatus is used, an alloy of 84 parts of zinc and 16 parts of tin, in pieces granulated in the same manner as zinc alone has hitherto been employed. When dilute sulphuric acid acts upon this alloy, hydrogen gas is produced in abundance from the first moment of contact, and when the zinc has been dissolved out, the remaining tin, now a metallic sponge, retains the shape of the original piece, and this prevents the access of any metal to the globular reservoir at the bottom.—Amer. Drugg., Sept., 1888, 176; from Chem. Ztg.

Water—Purification by Boiling under Pressure.—The boiling of water "to kill the microbes" has sometimes been recommended by physicians. Tellier has shown that this cannot be effected by a temperature of 212° F. He also observed that boiled water, being deprived of its air, is heavy and indigestible, and that through loss of the calcareous salts it becomes insipid, and is disagreeable to drink. He prepares water in a closed vessel, placed in a salt and water bath, by which he gets a temperature of 300° F. In using, the water is drawn from a filter-faucet placed near the bottom of the vessel. A small faucet at the top, to admit the air, is kept covered with cotton.—Amer. Jour. Phar., Nov. 1888, 562; from Arch. de Phar., Oct. 5, 1888.

Water—Rapid Analysis for Industrial Purposes.—L. Vignon describes a method which consists in saturating the acid carbonates contained in the water with lime, and then precipitating all the lime and magnesia salts still in solution with sodium carbonate. Phenolphthalein is used as an indicator, and decinormal clear lime-water is required. The titration is conducted in two narrow glass stoppered cylinders of about 100 c.c. capacity. Into one, 50 c.c. of distilled water and ten drops of an alcoholic solution of phenolphthalein are introduced; this is then colored by 0.2–0.5 c. c. of the normal lime solution, and kept as standard. The other cylinder is filled with 50 c.c. of the water under examination, 10 drops of phenolphthalein solution, and 5 c.c. of a 10-per-cent neutral calcium chloride solution. The normal lime-water is then added until, on agitating, the solution remains colored. The standard is now diluted until its volume corresponds to the volume of liquid in the other cylinder, and a little lime-water added to one or the other solution until the color in both is identical. The difference in the quantity of lime-water used for the standard and for the water under examination gives the quantity of lime which has combined with the free carbonic acid in the water.—Amer. Drugg., April, 1889, 62.

Water—Note on Clark's Soap Test.—Frank L. Tweed observes that when a standard soap solution is run into a solution of a calcium salt till a lather is formed, as for instance in determining hardness in water, it is commonly taken for granted that each equivalent of lime destroys an equivalent of soap.

Put in an equational form in the case of calcium sulphate and sodium oleate—

$$CaSO_4 + 2NaC_{18}N_{33}O_2 = Ca(C_{18}N_{33}O_2)_2 + Na_2SO_4$$

he finds that an equivalent of lime requires $1\frac{1}{3}$ equivalents of soap, or $CaSO_4$ requires $2\frac{2}{3}NaC_{18}H_{33}O_2$.

In the case of magnesium salts the reading is rather more obscure, but an equivalent of magnesia requires rather more soap.

As the mean of many experiments I find that an equivalent of magnesia requires $1\frac{1}{2}$ equivalents of soap, or $MgSO_4$ requires $3NaC_{18}H_{33}O_2$.

He obtained these results both with oleic acid and with the solid fatty acids (commercial stearic acid).

Mr. Wanklyn's statement in his "Water Analysis," that magnesium requires $1\frac{1}{2}$ times as much soap as calcium, is well known to be incorrect, but it is probably based on the observation that magnesium requires $1\frac{1}{2}$ times as much soap as theory indicates, coupled with the erroneous assumption that calcium requires only its theoretical quantity.—Amer. Drugg. June, 1889, 111; from Jour. Chem. Med.

Peroxide of Hydrogen—Manufacture on the Large Scale.—According to "Neueste Erfind. und Erfahr.," the following process is at present employed for the manufacture of peroxide of hydrogen on the large scale. Of course, the description refers only to one batch of materials from the beginning to the end. In large works, one batch follows another continuously, the several ones being only one step apart.

A copper boiler lined with lead is set into a wooden vat so that it may be surrounded by water. The bottom of the boiler rests upon a perforated false bottom, below which ends a pipe through which cold water may be admitted, an outlet being provided for at the side, and another at the highest point of the vat. The boiler is charged with 15 kilos of commercial hydrofluoric acid (which is made on the large scale on the premises), together with 80 kilos of water, and the dilute acid then exactly neutralized with barium peroxide (likewise made on the premises), previously ground to a smooth paste with about 20 liters of water. About 15 kilos of the peroxide will be required. The products are insoluble fluoride of barium and a solution of peroxide of hydrogen. During the reaction, the temperature of the contents of the boiler must be kept as low as possible by means of a bath of cold water. The paste of barium peroxide must be added in small quantities at a time, since each addition causes a rise of temperature. The contents of the boiler must be constantly stirred. About 12 hours are required for the reaction to be com-

pleted, which is indicated by litmus paper showing a violet-blue tint. The liquid represents about 100 liters of commercial peroxide of hydrogen of 10 to 12 volumes of oxygen. The residuary fluoride of barium is again employed in the manufacture of hydrofluoric acid by decomposition with sulphuric acid.—Amer. Drugg., Feb. 1889, 33.

Hydrogen Peroxide, C. P.—*Preparation from the Crude Commercial Article.*—Dr. Mann observes that commercial hydrogen peroxide may contain HCl, H_2SO_4, H_3PO_4, HF, Al_2O_3, MgO, K_2O and Na_2O, as prepared for various purposes; generally CaO, derived from water, and, if carelessly prepared, BaO and traces of Fe, Cu, Pb, Mn, etc. The following process will remove all of these, if present: To the commercial preparation, containing about 3 per cent. H_2O_2, ¼ per cent. of pure concentrated H_3PO_4 is added, after which the solution is rendered *exactly neutral* by addition of $Ba(OH)_2$. This is the important step in the process, having for its object the precipitation of the phosphates of the heavy, as well as the alkaline-earth metals. The time required for the neutralization should be at least 15 minutes, during which period the liquid should be stirred continuously; a turbidity will occur, and on 3–5 minutes' standing, the precipitate will deposit, from which the supernatant clear liquid is decanted or separated by filtration. The filtrate is poured, with continual agitation, into a cold saturated solution of $Ba(OH)_2$, a precipitate of hydrated BaO_2, in pearly laminæ, readily separates; H_2O_2 (the filtrate) is added as long as a precipitate forms; this, toward the end of the process, only takes place on thorough stirring of the liquid; excess of H_2O_2 should be avoided. The precipitate is washed with distilled water by decantation until only Ba can be detected in the washings. 100 parts of distilled water are mixed with 10–12 parts of pure concentrated H_2SO_4, and to this is added, drop by drop, the BaO_2, mixed with sufficient distilled water to form a thin paste, until the acid is almost neutralized. The BaO_2, if added in too large portions, acts decomposingly on the H_2O_2 formed. The last traces of H_2SO_4 are best neutralized by the cautious addition of $Ba(OH)_2$; after standing 24 hours, the clear liquid is tested for Ba and H_2SO_4, and, if free from both, the liquid is syphoned off and, if necessary, filtered. Should either be present, it would have to be removed by addition of the proper reagent and the precipitate separated. The H_2O_2, thus purified, contains about 3 per cent., and will stand the most rigorous tests for purity and stability.—Amer. Jour. Pharm., Sept. 1888, 447–448; from Chem. Ztg., 1888, 857.

Hydrogen Peroxide.—Decomposition by *Chromic Acid*, which see.

Hydrogen Peroxide—Utility in Analysis.—F. P. Dunnington observes that lead peroxide may be most readily dissolved by treatment with dilute nitric acid and a solution of hydrogen peroxide. Half of the oxygen from each of the two peroxides unite to produce an effervescence of oxygen, even when cold, resulting in the formation of a solution of lead

nitrate. A similar action of hydrogen peroxide, he has frequently found of advantage in effecting the solution of a precipitate produced by ammonia and consisting mainly of ferric and alumina hydrates, in which, however, after washing, a little manganese is retained as Mn_2O_3. The latter body will resist solution in dilute acid, and under these circumstances a drop or two of hydrogen peroxide will instantly clear up the solution. In the same manner, ignited oxide of cerium or oxide of manganese may be readily dissolved by cold dilute acids mixed with hydrogen peroxide.'—Chem. News, Feb. 15, 1889, 76; from Journal of Analytical Chemistry, Vol. ii., part 4.

Peroxide of Hydrogen—Application for the Determination of the Metals of the Ferric Group.—Adolph Carnot observes that peroxide of hydrogen has the property of oxidizing the metals of the iron group under certain conditions, and to reduce them under others. He applies this property to the determination of the metals of this group. *Chromic acid* is reduced to chromic oxide from faintly acid solution, while *chromic oxide* is oxidized to chromic acid in alkaline solution. The titration of a chromate is made by dissolving the salt in water, faintly acidulated with hydrochloric or sulphuric acid, in such proportion that 50 c.c. shall not contain more than 0.2 to 0.3 gram of chromic acid. It is then titrated with dilute peroxide of hydrogen, which must be standardized with bichromate of potassium, until the evanescent blue color produced on the addition of each drop ceases to be formed. Chromic oxide is first oxidized by treating its ammoniacal solution with peroxide of hydrogen. The chromic acid, so produced, may then be determined as in the first case. *Manganese*, like chromium, is reduced by peroxide of hydrogen from its acid solution to manganous oxide, and this in alkaline solution is again converted by it into the higher oxide.—Arch. d. Pharm., May 1889, 472; from Jour. de Phar. et de Chim., 1889, XIX, 167.

Oxygenated Water—Use for Bleaching Wool, Wood, etc.—Alf. Delmart and P. Ebell, speaking of the oxygenated water obtained from a certain source, and its application to the bleaching of wool, wood, etc., observe that this particular product contains very small quantities of foreign bodies, *e. g.*, barium phosphate, but these impurities have a favorable action, as absolutely pure hydrogen peroxide has less bleaching power. The wool is treated in a cold bath, working in a wooden tub. The room should be cool, but not exposed to frost during the winter. The wool must be perfectly scoured. The oxygenated water may either be used pure or may be diluted with five to six volumes of rain water. A little ammonia is added, about 20 grms. of sp. gr. 0.910 to 100 litres. A slip of red litmus paper should be turned very slightly blue in a few seconds. The wool should not be left heaped up in the bath, but should be turned continually. The process may last from five to six hours. The coloring-matter is totally destroyed, so that the wool does not become

yellow in course of time like that which has been bleached with sulphurous acid. P. Ebell contradicts the assertion of Delmart that a pure oxygenated water is less effective than such as contains barium phosphate, which, if present, must be precipitated on the addition of ammonia. He denies also that a cold bath is always necessary, and he maintains that dilution is not advantageous, the liquid, as supplied, containing 3 per cent. of actual hydrogen peroxide, giving the best results.—Chem. News, Feb. 15, 1889, 84; from Chem. Ztg.

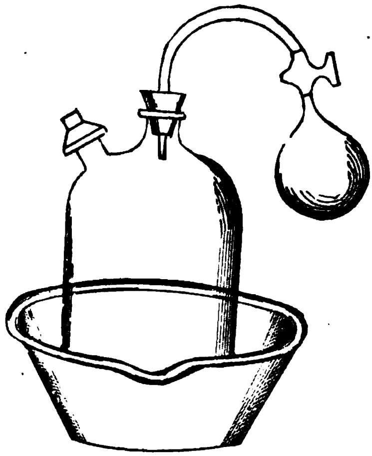
NITROGEN.

Nitrogen—Best Method of Preparation for Lecture Purposes.—Charles R. C. Tichborne states that the best method of preparing nitrogen for lecture experiments, or when required in pure form, is, in his opinion, unquestionably based upon the decomposition of ammonium nitrite. The apparatus required is a retort of the right size and a bent tube, the process being carried out by the author as follows: Ten grams of ammonium sulphate and ten grams of sodium nitrite are mixed in a capacious retort (½ litre) with 40 c.c. of glycerin and 60 c.c. of water. The retort is placed with the neck elevated to an angle of about 40°, so that the water may condense and fall back into the retort. The bent tube, fitted with a cork into the neck, conducts the gas into the wash-bottle, or it may be collected at once without washing. Water alone (100 c.c.) may be used, but the process does not go on quite as regularly. Heat is applied directly to the retort, and the disengagement of free nitrogen begins at a temperature a few degrees below the boiling point of water. The reaction proceeds steadily but rapidly, the temperature generally rising a little above the boiling point, then beginning to fall, making it necessary to slightly increase the heat towards the end of the reaction. By carefully regulating the temperature almost pure and neutral nitrogen is evolved, but a trace of nitrogen dioxide is ordinarily produced, which may be removed by washing.—Pharm. Jour. and Trans., May 11, 1889, 905; from Chem. News.

Nitrogen—Apparatus for Its Convenient Preparation from Air.—H. N. Warren regards the preparation of nitrogen from air by the action of burning phosphorus an elegant, and at the same time uncostly method, and preferable to other methods proposed. No one appears hitherto to have adopted a plan to collect the gas, however, and the object of the author's present paper is to call attention to a device which enables the production of very pure nitrogen in any desired quantity. The accompanying cut (Fig 30), which is intended to illustrate the apparatus required, consists mainly of a doubly tubulated gas receiver or bell-jar connected either with a bladder provided with a suitable stop-cock, or, if required in larger quantities, to an ordinary gas-holder, the outer vessel containing a sufficiency of water to allow of the gas-jar

at the termination of the action to be immersed to the required height. In using the apparatus all that is necessary is to apply a hot wire to the pieces of phosphorus contained in the small brass dish, the same being allowed to float upon the surface of the water. This is most readily accomplished by withdrawing the stopper from the

FIG. 30.



Apparatus for Preparing Nitrogen Gas.

side tubule, inseiting a hot wire in order to start the combustion of the phosphorus, and replacing the stopper. The apparatus and its contents, after the combustion of the phosphorus has terminated, is allowed to remain a few moments in contact with the water in order to allow the fumes of phosphoric pentoxide occasioned by the combustion ot the phosphorus to unite with the water. The stop-cock in connection with the receiver intended for the reception of the gas is now opened, the weight of the bell-jar exerting a pressure sufficient to allow of its contents to be discharged into the receiver. The tap in connection with the receiver is next closed, the stopper from the side tubule again withdrawn, thus allowing on raising the apparatus to the surface of the water to admit of a fresh supply of air, which may be proceeded with as before. By this method, operating with a jar capable of retaining one cubic foot of atmosphere, a gas-holder able to contain six cubic feet of nitrogen may be filled in less than an hour.—Chem. News, March 22, 1889, 135.

Nitrogen Iodide—Influence of Light upon its Explosion.—A recent statement of L. Gattermann that the susceptibility to explosion of *nitrogen chloride* is very much increased by exposure to bright light, brings to

the mind of Prof. J. W. Mallet similar occurrences with *nitrogen iodide*, which on two occasions exploded while in the moist condition and under water. The circumstance was referred to in the Amer. Chem. Jour. (April, 1879), and he now remembers distinctly that he had just carried to a window, through which the sun was shining, a beaker full of water, at the bottom of which was the black sediment of iodide, and was gently stirring the liquid with a glass rod, holding the beaker up so as to look at it from below, when the rod touched the lower part of the side or the bottom of the vessel, and the explosion occurred. In the other case the iodide was being washed with ice-cold water, the vessel being exposed to the direct rays of the sun; the explosion, as near as the author can remember, was precipitated by pouring some fresh liquid on the partially drained iodide. Prof. Mallet considers that under ordinary circumstances the iodide may be safely worked, but that in the two cases mentioned the direct sunlight doubtless brought about the explosion.—Am. Chem. Jour., Vol. X., No. 4.

Hyponitrous Oxide—Preparation of the Pure Gas.—According to G. Campani, hyponitrous oxide or nitrogen monoxide can be obtained perfectly pure by heating 5 parts crystallized stannous chloride, 10 parts hydrochloric acid sp. gr. 1.21, 0.9 parts nitric acid sp. gr. 1.38, until the mixture boils, when a steady evolution takes place according to the reaction:

$$2\ HNO_3+4\ SnCl_2+8\ HCl=4\ SnCl_4+N_2O+5\ H_2O.$$

The above proportions must be strictly adhered to.—Amer. Jour. Pharm., March 1889, 132; from Chem. Rpt., 1889, 5.

Nitrous Acid—Delicate Method of Detection.—W. Kalmann observes that nitrous acid in water, in quantities not detected by diphenylamine, is indicated on addition of hydriodic acid by the liberation of iodine after standing a short time—Chem. Rpt., 1888, 269.

Nitrites—Apparatus for their Estimation.—Profs. R. W. Dunstan and T. S. Dymond describe a very simple apparatus for the estimation of nitrites, which see in Pharm. Jour. and Trans., March 16, 1889, 741–743.

Nitric Acid—Determination in Wine.—E. Pollak communicates the following method for determining nitric acid in wine: One centigram of diphenylamine is dissolved in 10 c.c. of dilute sulphuric acid (1 part pure monohydrated acid and 3 parts water). It is diluted to 50 c.c. with strong sulphuric acid. For each assay 2 c.c. are poured into a small porcelain capsule. Meantime, the wine has been concentrated and decolorized by evaporation down to one-fifth over bone-black, previously washed and ignited. It is filtered through plugs of asbestos, as filter-paper almost always contains traces of nitric acid. The author takes two capsules of porcelain, each containing the reagent, and pours into each three to six drops of the wine prepared as above. If no blue coloration ap-

pears in ten minutes the absence of nitric acid is proved. Two out of twenty-five samples of pure wine gave a very feeble blue tint at the end of ten minutes. It thus appears that perfectly pure wines may contain traces of nitric acid, but in wines diluted with water the color is much more intense and rapid—Chem. News, Sept. 14, 1888, 133; from Chem. Ztg.

Nitrates—Estimation in Natural Waters.—S. C. Hooker recommends the following colorimetric method for the estimation of nitrates in water: 2 c. c. of the water are mixed with 4 c. c. concentrated sulphuric acid, and, after cooling, a small quantity of sulphuric acid in which carbazol is dissolved is added. The green color produced is compared with that produced by known quantities of nitrate of potassium under the same conditions. The process is expeditious, and a concentration of the water is not necessary so long as it contains $\frac{1}{500000}$ of nitric acid.—Arch. d. Pharm., Feb. 1889, 179; from Ber. d. D. Chem. Ges., 31, 3302.

Nitrates—Resorcinol a Delicate Reagent.—See *Resorcinol,* under "Organic Chemistry."

SULPHUR.

Sulphur—Determination in Sulphides Soluble in Acids.—In 1870, Dr. L. L. de Koninck published a process for the determination of the sulphuretted hydrogen given off by sulphuretted irons on treating them with hydrochloric acid or dilute sulphuric acid. This process consists in condensing the sulphuretted hydrogen in a series of three small washing-bottles containing a neutral solution of silver nitrate at two per cent.; in collecting the precipitate of silver sulphide and determining the sulphur. This determination is effected by treating the precipitate with bromine in presence of water, filtering off the silver bromide, and precipitating the sulphuric acid formed with barium chloride. The barium sulphate formed is very pure, being produced in a liquid free from fixed matters. Latterly the author has sought to simplify the process by substituting mercury for silver; the mercury forming, with bromine in excess, a soluble and volatile product, the advantages of the original process would be retained, and the filtration and washing of the precipitate of silver bromide would be avoided. To this end he absorbs the sulphuretted hydrogen in a mixed solution of mercury cyanide and ammonium chloride. This mixture readily absorbs the sulphuretted hydrogen, giving a black flocculent precipitate, which is easily collected on a filter and washed. On treatment with bromine and water it dissolves rapidly and completely, especially at a slightly elevated temperature, yielding sulphuric acid and mercury bromide. This process has been carefully verified and found strictly accurate.—Chem. News, Oct. 26, 1888, 208; from Rev. Universelle des Mines et de la Metall., 1888, No. 3.

Metallic Sulphides—Production by Carbon Disulphide at High Temperatures.—Arm. Gautier and L. Hallopeau, by treating iron at a red heat with carbon disulphide, have obtained a sulphide, Fe_4S_3, a substance of a crystalline fracture and of a yellowish grey color with bronze reflections. It can be filed and polished like soft iron. Its sp. gr. is 6.975. It is rather more magnetic than iron monosulphide. It undergoes no change on exposure to the air, and is not readily oxidized, even at a red heat. Weak acids dissolve it with an escape of hydrogen sulphide and hydrogen. If metallic manganese is heated to 1400° in the dry vapor of carbon disulphide, it becomes covered with a black layer of MnS, a compound which has been obtained before in the crystalline state by another method. No subsulphide is formed. If manganese silicate (rhodonite) is treated at white-redness with the vapor of carbon disulphide, a new compound is obtained, Mn_3S_4. It decomposes water, evolving H_2S, and leaving a hydrated manganese oxide.—Chem. News, May 10, 1889, 229; from Compt. rend., April 15, 1889.

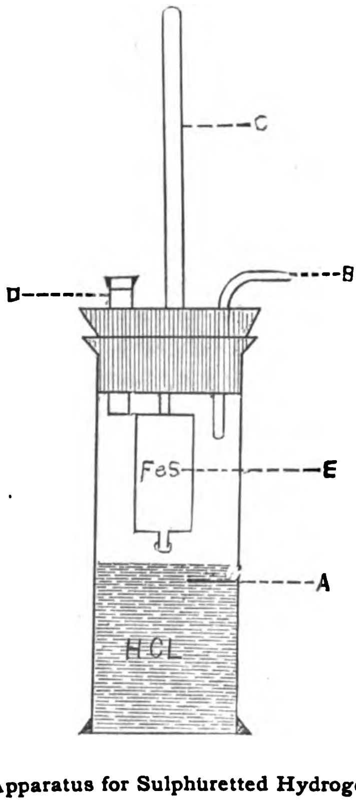
The same authors, referring to their above observations, describe the action of carbon disulphide upon nickel, chrome and lead. In each case a sulphide is obtained. The nickel compound Ni_3S has a metallic appearance and a yellowish lustre. It is absolutely non-magnetic. It does not decompose water, either hot or cold. It is but very slowly attacked by hydrochloric or sulphuric acid. Arfvedson's sulphide, Ni_2S, must have contained metallic nickel. The action of carbon disulphide upon chrome produces the well known sesquisulphide. The vapors of carbon disulphide convert lead into galena, mixed, at times, with lead sulphocarbonate.—Chem. News, June 21, 1889, 301; from Compt. rend., May 27, 1889.

Hydrogen Pentasulphide—Formation, Characters, etc.—H. Rebs, operating upon the polysulphides of potassium, so diumand barium, found that the di,-tri,-tetra,- and pentasulphides of these metals, when their aqueous solutions were poured into excess of hydrochloric acid, uniformly produced one and the same persulphide of hydrogen, viz., H_2S_5. This pentasulphide constitutes a light-yellow, transparent, mobile oil, having a peculiar odor, and the s. g. 1.71. When as dry as possible and preserved in closed tubes, it decomposes but slowly, but rapidly in contact with water under formation of sulphuretted hydrogen and separation of sulphur.—Arch. d. Pharm., Aug. 1888, 746; from Liebig's Ann. d. Chem., 246, 356.

Sulphuretted Hydrogen—Composition of the Crystalline Hydrate.—By the aid of an ingeniously constructed apparatus, de Forcrand and Villard have succeeded in preparing perfectly dry crystals of the hydrate of sulphuretted hydrogen, which they find has the composition, $H_2S + 7H_2O$, —Arch. d. Pharm., May 1889, 470; from Bull. Soc. Chim., 1889. No. 1, 39.

Sulphuretted Hydrogen—Correction of Analytical Results.—The determination of sulphuretted hydrogen, as well as of soluble sulphides in mineral waters, is usually accomplished iodometrically, and it is well known that the results are liable to vary according to the variations in the temperature at which the experiment is made, being smaller as the temperature approaches 0° C. Simair has studied the subject and has constructed a table which defines the correction to be made for each degree between

FIG. 31.



Apparatus for Sulphuretted Hydrogen.

0° and 50° C. While the correction amounts to only 0.96 mg. of the consumed iodine per 1 liter of water at 0° C., it amounts to 20.0 mg. at 50° C.—Arch. d. Phar., Aug. 1888, 752; from Jour. de Phar. et de Chim., 1888, xviii, 7.

Sulphuretted Hydrogen.—Generation, free from arsenic, from *Barium sulphide*, which see under "Barium."

Sulphuretted Hydrogen—Cheap Apparatus.—J. Martin describes the apparatus shown in the accompanying cut (Fig. 31), which may be con-

structed cheaply, and is found very satisfactory. *A* is a large glass cylinder, such as is used for deflagration experiments, tightly fitted with a well paraffined cork with three holes. *C* is a stout glass rod which passes through the centre hole in the cork and through a hole in the bottom of a cylindrical porcelain vessel, *E*, which is supported by the end of the rod being flattened. The bottom of the porcelain vessel is drilled with several small holes. *B* is the delivery tube for the gas, and *D* is a short wide tube so placed that its lower end is perpendicularly over the interior vessel, and closed at the top with a cork. The gas is of course generated by placing Fe S in the porcelain vessel and acid in the lower part of the glass cylinder, and pushing down the rod. The strength of the current can be regulated with considerable nicety, or may be stopped completely by raising the porcelain vessel above the liquid. The rod should pass with sufficient friction to be retained in any position desired, but as a precaution it may be well to place a piece of caoutchouc tubing on the rod above to prevent its slipping down.—Chem. News, Aug. 31, 1888, 99.

Sulphuretted Hydrogen—Apparatus for Generation.—John H. J. Dagger describes an apparatus for generating H_2S, which consists essentially of two globular vessels, having a tubulure above and below, the lower tubulure being in the one case elongated so that a piece of rubber tubing may be slipped over it. This latter vessel contains the acid, the other one the ferrous sulphite in lumps. In this, the lower (short) tubulure bears a glass tube extending both inwardly and outwardly through a tight-fitting cork, the outer part of the tube being expanded to an elongated bulb upon which the other end of the rubber tube is slipped, the connection being made secure by wrapping with platinum wire. The application of this arrangement is obvious. Upon raising the vessel containing the acid, the latter enters into the second vessel containing the ferrous sulphide, and gas is generated, the flow being regulated by permitting greater or less contact, or stopped altogether by again lowering the first vessel. The apparatus is shown in an illustration accompanying the original paper, which it is not necessary to reproduce here.—See Chem. News, Sept. 14, 1888, 127.

Sulphuretted Hydrogen—Detection in Urine.—For the detection of sulphuretted hydrogen in urine, F. Müller passes through the sample a current of air which has been freed from sulphuretted hydrogen by a previous passage through potassa lye, and allows it to issue through a narrow tube, at the mouth of which is a slip of paper saturated with an alkaline solution of lead acetate, and which will turn brown if sulphuretted hydrogen is present.—Zeitschrift f. Anal. Chem., xxvii., part 1.

Hyposulphites—Characters, etc., of Several New Salts.—K. Klüss communicates the results of comprehensive experiments upon hyposulphites, and describes several new compounds. While the author retains

the dihydric formula for hyposulphurous acid ($H_2S_2O_6$), he regards it an open question whether the view of Berzelius, supported by that of Kolbe more recently, is not the correct one, which view would make the equivalent just one-half (= HSO_3.) Neither formula has been thoroughly established. Mr. Klüss prepared

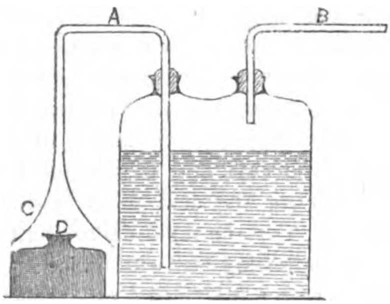
Hyposulphite of Thorium by digesting an excess of freshly precipitated thorium hydrate with aqueous hyposulphurous acid for several weeks. The salt has the composition $Th.(S_2O_6)_2+4Aq.$, and is extremely unstable.

Hyposulphite of Chromium is obtained by mixing the calculated quantities of violet chromic sulphate and hyposulphite of barium. The blue-violet solution produced is carefully evaporated at a moderate temperature, and finally spontaneously, when the salt separates in the form of small violet colored octahedrons. The salt has the composition $Cr(S_2O_6)_3+Aq.$, and is readily soluble in water and in alcohol.

Hyposulphite of Ammonium $(NH_4)_2S_2O_6+\frac{1}{2}Aq.$, separates when the solution of equivalents of hyposulphite of barium and sulphate of ammonium is concentrated at a moderate temperature. It constitutes felty masses of small, shining needles.—Arch. d. Pharm., Aug. 1888, 745–746; from Liebig's Ann. d. Chem., 246, 179.

Sulphurous Acid—New Form of Apparatus.—Rev. E. Rattenbury Hodges describes the following simple arrangement, shown by Fig. 32, for the preparation of solution of sulphurous acid: A Woulff's bottle,

FIG. 32.



Apparatus for Preparing Sulphurous Acid.

having two necks, is provided with two bent glass tubes, A and B, fitted in with corks in the usual manner. The tube A reaches nearly to the bottom of the bottle, the other end being attached by a short piece of India rubber tubing to an inverted glass funnel, C. Beneath this latter, and resting on a wood block or ring of a retort stand, is a small iron dish, D, whose diameter allows about the eighth of an inch of air space. To set

the apparatus in action, the bottle is two-thirds filled with water and the tubes are replaced. Fragments of sulphur are now put in the dish, lighted, and placed under the funnel, and the tube, B, connected with a Geissler filter pump, which is put in action. By this means the SO_2 evolved is readily drawn into the water and dissolved. This method takes less time, and there is also less risk of breakage of apparatus than by that usually followed, *i. e.*, by the decomposition of sulphuric acid, a process not altogether free from danger to the operator.—Chem. News, Oct. 19, 1888, 187.

Sulphurous Acid—Caution Respecting its Use in Iodometry—J. Volhard observes that sulphurous acid is decomposed by hydrogen iodide with formation of iodine, water, and sulphur (a little hydrogen sulphide). Sulphurous acid in a saturated aqueous solution is decomposed by hydrogen iodide. The iodine is here not set free, but re-converted into hydrogen iodide with formation of sulphuric acid. Thus, the total result of the reaction is a catalysis of sulphurous acid into sulphur and sulphuric acid. This reductive action of hydrogen iodide is avoided if a moderately strong solution of sulphurous acid is poured into the solution of iodine. With this modification Bunsen's iodometric method is the most accurate known.— Chem. News, July 27, 1888, 49; from Zeitsch. f. Anal. Chem., xxvii., part 1.

Sulphurous Acid and Sulphite of Sodium—Convenient Method of Determining the Quality.—Barnard S. Proctor observes that, in view of the instability of sulphurous acid and of sulphite of sodium, it is desirable that pharmacists should have a more ready means of ascertaining the condition of their stock than the volumetric method of the B. P. Such is offered by him in the following, applicable to sulphurous acid: Put into an ounce vial 11 grains of iodine and 15 grains of iodide of potassium, pour upon them a fluid drachm of the acid to be tested, rinse the measure with a drachm of water, adding this to the contents of the vial, and shake. The iodine color should disappear, if the acid is of the full strength; this, however, is not often the case, and the degree of deficiency may be roughly estimated by adding the acid in successive portions until the brown color disappears. For the rapid determination of the quality of sulphite of sodium, the following test will suffice: Take 10 grains of resublimed iodine, rub it with a drachm of water, then weigh 10 grains of the sulphite, and add the bulk of it—reserving about ½ grain—to the contents of the mortar. The color should disappear nearly completely after a moment's trituration, and completely on the addition of the reserved portion of sulphite. The B. P. statement that sulphite of sodium is "readily soluble in water, and *very* soluble in spirit" is misleading. While 100 parts of water at 58° F. will dissolve 58.5 parts of the crystallized sulphite, he finds that it is soluble only to the extent of 1 part in 100000 (roughly estimated) of rectified spirit.—Phar. Jour. and Trans., Jan. 19, 1889, 555–557.

Sulphuric Acid—New Method of Preparation.—Carl Polony gives the following process for preparing sulphuric acid from sulphate of lime: The sulphate of lime in small pieces is placed in a crucible and exposed for 3 hours to a temperature varying between 600° and 1500°C., and at the same time to a jet of superheated steam, when the sulphate decomposes, forming sulphuric acid and hydrated lime. The acid vapors are concentrated by the usual methods. According to the "Monit. des. prod. Chim." the sulphates of sodium, barium and strontium may be used in the same way.—Amer. Jour. Pharm., Sept., 1888, 449; from Nouv. Rem., Aug. 8, 1888.

Sulphuric Acid—Test for Free Acid.—Egger proposes the furfurol color reaction as a test for free sulphuric acid, and his experiments show that 1 c.c. of $\frac{1}{1000}$ normal sulphuric acid (containing 0.000049 gm.) warmed on a water-bath with a small particle of cholic acid and two drops of a furfurol solution, will give a decided red coloration.—Am. Jour. Phar., Nov. 1888, 560; from Chemiker Ztg., 1888, 1245.

Sulphuric Acid—Removal of Ammonium Salts.—In determining nitrogen by means of Kjeldahl's method—conversion of the nitrogen compound into ammonia—it is necessary to employ sulphuric acid absolutely free from salts of ammonium. This may be accomplished, according to Meldola and Moritz, by warming the acid with nitrite of potassium, about 0.05 gm. of the latter being required for every 100 c.c. of the acid. The warming must be continued for about two and a half hours. Any ammonia present is thereby decomposed into nitrogen and water, and the excess of nitrous acid is all dissipated. The reaction which takes place is the following:

$$\underset{\text{ammonia}}{NH_3} + \underset{\text{nitrous acid}}{NO.OH} = \underset{\text{nitrogen}}{N_2} + \underset{\text{water}}{H_2O}$$

—Amer. Drugg., Jan. 1889, 13; from Dingl. Pol. Jour.

Sulphates—Volumetric Determination.—For the volumetric determination of sulphates, H. Quantin proposes the following method: He dissolves in 200 c. c. of distilled water 19.48 grms. of neutral potassium chromate, and 50 to 100 c. c. of pure hydrochloric acid, and pours in slowly, stirring to dissolve the precipitate formed, 24.35 grms. barium chloride previously dissolved. He makes up to 1 litre and filters. Of this solution 50 c.c. precipitate from 0.3 to 0.4 of sulphuric acid. The excess of alkaline chromate involves a deduction as correction in all the readings. This correction is ascertained by precipitating with ammonia, in a total volume equal to that in which the determination is effected, the same quantity of barium chromate as in the analysis itself. Taking afterwards an equal fraction of the filtrate, we add a ferrous solution until a complete reduction is effected. The correction should be about 0.2 to 0.5 c.c. This correction may be determined once for all by precipitat-

ing in a flask marked at 1000 c.c., 100 c.c. of the solution with an excess of ammonia, and reducing with the ferrous liquid 100 c.c. of the filtrate mixed with 5 c.c. of pure sulphuric acid. The ferrous liquid is prepared by dissolving 20 grms. double iron and ammonium sulphate, and 10 c.c. of pure sulphuric acid, in 1 litre of water. The operation is conducted as follows: 1 grm. pure dry potassium sulphate is dissolved in 600 c.c. of water in a flask marked at 1 litre, 100 c.c. of the barium chromate are added and shaken up. When the liquid begins to grow clear, it is supersaturated with ammonia; when the liquid becomes of a sulphur yellow. It is filtered, and 100 c.c. of the perfectly clear liquid are taken, and to them are added 5 c.c. of pure sulphuric acid. The solution of iron is dropped in from a burette holding 50 c.c. The liquid turns from red to olive-brown green, and at last bluish-green. At this moment little drops of the liquid are taken up with a glass rod and placed upon drops of ferricyanide on a white slab, stopping as soon as there is a blue tint. The solution of ferricyanide must be fresh and so dilute as to appear colorless. The salt must not be used as a dry powder. The actual determination is performed in the same way. Chlorides and nitrates do not interfere; chlorates must not be present, and phosphates must be previously eliminated. All such cases may be previously prepared as follows: The organic matter, if any, is destroyed by projecting the matter in small portions into pure melting sodium nitrate. The mass is dissolved in boiling water, and precipitated with a slight excess of ammonia along with calcium chloride. Lastly there is added a little sodium carbonate, and the liquid is filtered.—Chem. News, Febr. 8, 1889, 72; from Bull. Soc. Chim., 1889, No. 1.

Mineral Acid—General Method of Determination.—G. Linossier communicates a new general method for the determination of acids, which is applicable to all the acids capable of forming an insoluble compound with any of the metals precipitable by sulphuretted hydrogen. The acid is separated from the solution by causing the formation of such an insoluble compound, which is then decomposed by means of sulphuretted hydrogen, and the acid thus liberated is determined directly by acidimetry, either after the sulphuretted hydrogen has been eliminated by boiling, or by using an indicator not affected by that sulphide, such as Poirrier's orangé. The process, in case of

Sulphuric Acid, is as follows: The solution of sulphate, containing preferably from 0.05 to 0.1 gm. of sulphuric acid, is placed in a capsule, mixed with from 1 to 2 vols. of strong alcohol, heated almost to a boil, and precipitated with a slight excess of neutral lead acetate. The lead sulphate then collects quickly at the bottom of the capsule. When cold, the clear supernatant liquid is poured upon a filter, the precipitate is washed by decantation with a mixture of alcohol with from ½ to 1 vol. of water, throwing the washings each time upon the filter. It is impor-

tant that these liquids should only bring the smallest possible quantity of the precipitate. When the washing is completed, *i. e.*, when a drop of the filtered liquid is no longer colored by sulphuretted hydrogen, the funnel containing the filter is placed above a clean flask, and a saturated solution of sulphuretted hydrogen is poured into the filter to convert any residual traces of lead sulphate into sulphide. The mass of lead sulphate remaining in the capsule is treated in like manner with a saturated solution of sulphuretted hydrogen, and the mixture is well agitated to ensure the complete transformation of the sulphate into sulphide. Lastly, the liquid and the lead sulphide are thrown upon the filter and washed with a solution of sulphuretted hydrogen until a drop of the filtered liquid gives no reaction with Poirrier's orangé. At this moment all the sulphuric acid is found in the free state in the filtrate. It is determined with a decinormal solution of soda after the addition of Poirrier's orangé. The method is expeditious and strictly accurate, but it is applicable only in the absence of acids capable of reacting upon Poirrier's orangé, and of precipitating salts of lead. All causes which interfere with the determination of lead in the state of sulphate (presence of free nitric acid, ammoniacal salts, etc.), interfere with the accuracy of the results.—Chem. News, Nov. 2, 1888, 220; from Bull. Soc. Chim., July 1888.

CHLORINE.

Chlorine—Volumetric Method of Determination.—John Tsawoo White proposes a method for determining chlorine in a mixture of soluble haloid salts, the bromide, if any, being previously separated by boiling with aluminium sulphate and potassium permanganate. The solution is mixed with 1 grm. potassium permanganate and 5 c. c. of dilute H_2SO_4 of equal volumes of the strong acid and water, the total volume being 50 c. c. This is gently heated in a current of carbon dioxide, the liberated chlorine being absorbed by a solution of potassium iodide. Active ebullition is not necessary, and the condensing steam will heat the iodide solution. Fifteen minutes' heating may be considered sufficient. To be certain it may be again heated for another quarter of an hour, using fresh iodide solution. If the iodine liberated then is discolored by a drop of decinormal thiosulphate it may be disregarded, for on heating a solution consecutively three times for a quarter of an hour each time with fresh iodide solution, a trace of iodine was always liberated, and the blue solution was decolorized by a drop of N/10 $Na_2S_2O_3$, a quantity representing less than 0.0002 Cl. With the above quantities of permanganate and sulphuric acid, 0.100 Cl may be distilled. The following are the results obtained by the method, the amount taken being determined by a silver solution, and the liberated iodine titrated by N/10 $Na_2S_2O_3$, standardized with $K_2Cr_2O_7$.

Taken.	Found.
0.0026 Cl	0.0030 Cl
0.0131 Cl	0.0140 Cl
0.0524 Cl	0.0539 Cl
0.0026 Cl+0.0082 Br	0.0035 Cl+0.0083 Br
0.0262 Cl+0.0421 Br	0.0274 Cl+0.0429 Br
0.0262 Cl	0.0267 Cl
0 0131 Cl	0.0129 Cl

The experiments are given in the order that they were tried. In trying the last three experiments the carbon dioxide obtained from marble and hydrochloric acid was passed through a solution of sodium dicarbonate to free it from traces of acid vapor, the results in the previous experiments having been too high. Methods having been established for the determination of bromine and iodine in admixture with other haloids, the problem of the direct method of determination of the three in their admixture seems thus to have been fairly solved.—Chem. News, Nov. 9, 1888, 229–230.

Chlorine.—New reaction with certain *alkaloids*, which see under "Organic Chemistry."

Chlorine and Ferric Chloride—Vapor Density.—C. Friedel and J. M. Crafts have previously shown that the vapor-density of aluminium chloride is constant between 288° and 400°, and corresponds with the formula Al_2Cl_6. Deville and Troost's experiments with ferric chloride gave results corresponding with the formula Fe_2Cl_6, but the later determinations of V. Meyer and Grünewald have shown that between 440° and 1300° the vapor-density is always lower than that corresponding with Fe_2Cl_6, and agrees more nearly with the formula $FeCl_3$. There is always, however, a want of agreement between the observed and calculated values, because at temperatures above 518° the ferric chloride decomposes into ferrous chloride and chlorine. The authors point out that Meyer's results do not agree at all well with the formula $FeCl_3$, and consider that above 750° the ferric chloride dissociates into Fe_2Cl_4 and Cl_2, whilst the further reduction of density observed above 1052° is due to the partial dissociation of Fe_2Cl_4 into $2FeCl_2$. The boiling point of ferrous chloride and its vapor-density are, however, not yet known. They find that, contrary to the statement of Meyer and Grünewald, ferric chloride in an atmosphere of nitrogen is dissociated into chlorine and ferrous chloride, the latter being deposited in almost colorless crystals, which do not recombine with the liberated chlorine on cooling, nor after remaining in contact with it at the ordinary temperature for several days. The ferrous chloride is not volatile at 440°, and hence the volume of gas in the apparatus is not altered in consequence of the dissociation.

By methods which the authors describe, they have made the following determination of the vapor densities of the two substances:

Chlorine:

Temperature . . .	19.7°	21.6°	23.0°	356.9°	440.°
Sp. gr.	2.479	2.458	2.475	2.451	2.448

Ferric Chloride:

Temperature . .	321.6°	325.2°	356.9°	357.0°	442.2°	442.2°
Vapor-density . .	11.41	12.47	12.04	11.85	11.66	11.30

—Jour. Chem. Soc., 1888, 1251; from Compt. Rend., cvii. 301–306.

Hydrochloric Acid—Determination in the Contents of the Stomach.—J. Sjöqvist, after criticising the older methods for the determination of free hydrochloric acid in the contents of the stomach, recommends the folfowing as giving absolutely accurate results, and as sufficiently simple to use clinically: The contents of the stomach are evaporated to dryness with barium carbonate and then incinerated; barium chloride remains unchanged, and the salts of the organic acids are burnt to barium carbonate. The barium chloride is then extracted with water, and the quantity of barium dissolved is a measure of the original amount of free hydrochloric acid. The barium may be estimated by Mohr's titration method. In this method, potassium dichromate is added to the barium solution, by which means a precipitate insoluble in water and acetic acid is formed; the indicator of the end of the reaction is the yellow color which the smallest excess of the dichromate gives to the liquid which floats over the precipitate. A more delicate test for excess of the dichromate is, however, Wurster's tetramethylparaphenylenediamine paper. Potassium dichromate in an acetic acid solution acts in the same way as ozone, to test for which the paper was originally used; it turns it blue.

The titration is carried out as follows: The solution of barium chloride is placed in a beaker, and a quarter of its volume of alcohol added, then a few c.c. of a 10 per cent. solution of sodium carbonate containing 10 per cent. of acetic acid. A standard solution of potassium dichromate is then added from a burette till the end-reaction is obtained. Directions are given for the preparation of the standard solution; the most convenient was found to be one of which each c.c. corresponded to 4.05 mgrms. of HCl.

The method was tested with known strengths of hydrochloric acid, and mixtures of hydrochloric and lactic acids, and with artificial gastric juice. The results obtained were exceedingly accurate. The paper concludes with the account of the results obtained from actual stomach-contents by the use of the method. These may be summarized as follows:

Case.	Reactions for HCl.	Reactions for lactic acid.	Percentages.	
			Total acidity.	HCl.
1	Doubtful	Well marked	0.15	0.02
2	Positive	Positive	0.29	0.132
3	"	"	——	0.076
4	"	Doubtful	0.2	0.138
5	"	Positive	0.295	0.144
6	"	Weak	0.189	0.164
7	Negative	Positive	0.14	0.03

—Jour. Chem. Soc., March 1889; from Zeit. Physiol. Chem. xii., 1–11.

Chlorinated Lime.—Examination of Commercial Samples.—Hermann M. Schroeter has determined the amount of available chlorine in eighteen commercial samples of chlorinated lime. Remembering that the Pharmacopœia requires at least 25 per cent. of available chlorine, the results are interesting, since they show the superior quality of the commercial product.

1.	25.73 per cent.	7.	31.11 per cent.	13.	29.17 per cent.
2.	37.00 "	8.	25.73 "	14.	31.16 "
3.	35.75 "	9.	25.83 "	15.	30.76 "
4.	31.91 "	10.	22.63 "	16.	30.91 "
5.	24.33 "	11.	24.53 "	17.	27.92 "
6.	37.84 "	12.	28.17 "	18.	36.46 "

Nos. 1, 2, 3, 4, 14, 15, 16 and 17, were obtained in bulk. Nos. 6 and 12 were 1 lb. packages, and the balance were smaller parcels. The above figures give an average percentage of 29.83 per cent. of chlorine.—Amer. Jour. Phar., Jan. 1889, 13–14.

Chlorate of Potassium—Action on Manganese Dioxide.—Dr. W. R. Hodgkinson and F. R. S. Lounder have for some time been engaged in investigating the reaction between chlorate of potassium and metallic oxides, when they are subjected to heat, together, for the purpose of producing oxygen. As a result of their researches they are led to observe, that it is usually supposed that when potassium chlorate ($KClO_3$) and manganese dioxide (MnO_2) are heated together, the MnO_2 remains as such in the vessel, together with potassium chloride (KCl). In only exceptional cases does this appear to be the case. The manganese is to a greater or less extent in the form of lower oxides. Only when the mixture has been heated until the whole of the oxygen is driven off, and a gentle heat maintained for some time, is the manganese completely reoxidized. In one case only out of a number of fourteen or fifteen, the authors were able, by continuous heating, to obtain MnO_2. In this series of experiments, a weighed quantity of pure potassium chlorate was heated

with a weighed amount of manganese dioxide, in a cleaned, weighed test-tube. The residue in the tube was weighed after cooling. [It was found to correspond in weight with the theoretical amount of KCl and MnO_2, within 0.0006 gm., a difference which is well within the limits of analytical errors.]—Amer. Drugg., April 1889, 68; from Chem. News, Feb. 8, 1889, 63.

Potassium Chlorate—Chemistry of its Decomposition in Presence of Manganic Peroxide.—Having observed the alteration in appearance that peroxide of manganese undergoes when heated with potassic chlorate, H. McLeod of the British Chemical Society made a number of experiments, using different kinds of oxide of manganese, determining the loss of weight that the mixture suffers when heated, and also the quantity of chlorine simultaneously generated. The heating was generally effected by the vapor of boiling mercury, at which temperature the potassic chlorate is not changed. The more finely divided the peroxide, the more rapid is the action and the more chlorine is evolved. When the evolution of chlorine is prevented by the addition of a small quantity of sodic or potassic carbonate, the decomposition of the chlorate proceeds very slowly, unless the temperature be raised much above that of boiling mercury. When potassic chlorate is fused with a minute quantity of peroxide of manganese, the residue is found to be pink on cooling, indicating the presence of a permanganate; and inasmuch as potassic permanganate is decomposed at a temperature of 275°, it is not improbable that the permanganate is decomposed by the heat as rapidly as it is produced into potassic manganate, manganic peroxide, and oxygen; the resulting potassic manganate is acted on by chlorine generated by the action of the peroxide on some fresh chlorate, forming potassic chloride, manganic peroxide and oxygen, so that the peroxide is being continually reproduced. The quantity of chlorine evolved corresponds to only a very small proportion of the manganic peroxide present, so if the first action really takes place, the chlorine must be absorbed and employed in converting the potassium into chloride.—Chem. News, March 1, 1889, 104.

Chlorate of Potassium—Incompatibility with Ferrous Iodide.—Attention is again drawn to the incompatibility of chlorate of potassium with preparations of ferrous iodide. Ferric oxide is gradually thrown down, and free iodine is liberated, according to the reaction:

$$\underset{\substack{\text{ferrous}\\ \text{iodide}}}{2FeI_2} + \underset{\substack{\text{potass.}\\ \text{chlorate}}}{KClO_3} = \underset{\substack{\text{ferric}\\ \text{oxide}}}{Fe_2O_3} + \underset{\substack{\text{potass.}\\ \text{chloride.}}}{KCl} + \underset{\text{iodine.}}{2I_2}.$$

The addition of chlorate of potassium to syrup of iodide of iron, therefore, is to be avoided.—Amer. Drugg., Febr., 1889, 36; from Boll. Farmac.

Chlorate of Potassium—Danger of its Administration to Children.—The

following from "Bull. Com." (Jan. 1889), may serve to cause further inquiry respecting the alleged poisonous character of chlorate of potassium. A pharmacist states that he often gets a prescription as follows: Chlorate of potassium, 5 gm.; dist. water, 120 gm.; simple syrup, 30 gm.; a dessertspoonful every half hour. "Children who take this," adds the pharmacist, "*always die.*" M. Brouardel cites six cases of death in children after using a similar potion.—Amer. Jour. Pharm., April, 1889, 174.

BROMINE.

Bromine—New Method for its Separation from Iodine and Chlorine.—John Tsawoo White has found that bromine may be liberated from bromides, and estimated even in the presence of iodides and chlorides, by heating the aqueous solution of the bromide or mixture with a solution of potassium permanganate and sulphate of aluminium. Supposing the solution to be tested to contain 0.1 gm. of bromine, it is introduced into a distilling flask, 10 c.c. of permanganate solution (1:25) added, and the apparatus being ready for distillation, 5 c.c. of an aqueous solution of sulphate of aluminium, saturated at the ordinary temperature, is introduced, and heat applied. Only bromine will be given off. This may be collected in a standard solution of iodide of potassium, and the liberated iodine—equivalent to the bromine—estimated by hyposulphite. There seems to be, however, still more uncertainty whether the method can be used for the quantitative estimation of bromine. Meanwhile it will serve as a qualitative test easily applied.—Chem. News, 1888, 233 and 245; Am. Drugg., Sept. 1888, 174.

Bromine and Iodine—Toxicological Detection.—Vitali recommends the toxicological detection of bromine and iodine by a method based upon the following observation: If 1 grm. bromine or iodine is dissolved or suspended in water and brought in contact with at least 300 grms. finely minced flesh, every smell of the halogens disappears in a few minutes, and no trace of them is to be found in a free condition, as they are principally converted into halogen hydracids, which exist partly in a free state and partly in combination with albumenoids. These compounds are soluble partly in alcohol, but partly only in water. The halogens can be obtained from the residue of the extracts by treatment with caustic alkali. —Chem. News, Oct. 26, 1888, 208; from Zeitsch. f. Analyt. Chem., xxvii. No. 4.

Hydrobromic Acid—New Method of Making.—V. Merz and E. Holzmann have studied the conditions under which hydrobromic and hydriodic acids are generated from the elements, and have found, at least for hydrobromic acid, a new practical process by which it may be prepared on the large scale. The process involves certain features which will have to be specially provided for, such as a constant, and of course cheap, current of hydrogen. But this is easily provided for.

The new process is as follows:

Conduct a *rapid* current of hydrogen, impregnated with much vapor of bromine, produced by warming bromine in a flask, successively through

1. A combustion tube (of glass, such as is used for ultimate analysis), kept at a low red heat in the combustion furnace.

2. Through a Woulf's bottle having three tubulures, into one of which an additional current of hydrogen passes to help carry forward the products of combustion.

3. Through a second short combustion tube, at a red heat; and

4. Into pure water.

The object of the interposed Woulf's bottle is to permit a control of the quantity of bromine vapor produced by warming the flask containing it. Its quantity is recognized approximately by the more or less strong tint of the current of gas. If the latter is but slightly tinted, it will cease to contain free bromine after having passed the second combustion tube. In this way a colorless solution of hydrobromic acid gas is obtained, which may be made so concentrated as to become fuming.

The authors think it would be an additional advantage—in order to insure the entire absence of free bromine in the product—to pass the mixed current over metallic antimony before it is made to enter the water. But, as Harding has pointed out, the current must be cold when it passes the antimony. Suitable provision must therefore be made to cool the current.—Amer. Drugg., June, 1889 102; from Berichte, 1889, 868.

Bromide of Ammonium—Officinal Characters.—According to different Pharmacopœias and authorities, bromide of ammonium should not react acid to litmus, and the salt is liable to turn yellow on exposure to air for some time, the latter effect being attributed to the presence of bromic acid (bromate) due to the method or process of preparation. K. Thümmel has taken up this subject, and, after comprehensive and careful experiments, concludes that ammonium bromide possesses in itself an acid, reaction upon moist litmus paper, just as does chloride of ammonium, though slightly stronger. He prepared the salt by different methods—by saturating ammonia or ammonium carbonate with hydrobromic acid, as well as by saturating bromine direct with ammonia, by simply evaporating the more or less concentrated acid, alkaline, and neutral solutions, and drying on filter paper direct, or after washing with alcohol. In all cases he found the salt to react faintly acid, and in no case did he observe the formation of bromate, or that the salt became yellow on exposure to air. In a salt containing 0.02 per cent. of bromic acid, the latter is recognized readily by the yellow color developed on the addition of sulphuric acid. This test applied to the author's products failed to reveal its presence.—Arch. d. Pharm., Dec. 1888, 1124–1126.

Referring to Thümmel's above observations, Dr. E. Bosetti maintains

that an oxygen compound of bromine is invariably formed—whether hypobromite or bromate is not determined—when ammonia is saturated directly with bromine. A colorless solution freshly prepared in this manner, at once becomes yellow on addition of sulphuric acid. These oxygen compounds are, however, decomposed during the process of evaporation, and when the process is carried out on a small scale, they may disappear altogether. On a large scale it is very different, and it may occur that small portions of bromate (or hypobromite) may escape decomposition, and be retained by the finished salt. Ibid, Feb. 1889, 120–121.

In a second paper (Ibid, March 1889, 270–271) Thümmel, in reply to Bosetti, records the results of some further experiments, which lead him to maintain that oxygen compounds of bromine are not produced under the conditions in controversy. He admits that the colorless solution of a salt prepared on a large scale may give a yellow color with sulphuric acid, but this he has proven is due to the formation of a small quantity of bromo-bromide. To avoid the formation of the latter, even on the most extended scale, it is simply necessary to use a slight excess of ammonia in the preparation.

Hypobromite of Sodium—Action upon Certain Aromatic Derivatives.—According to a recent communication to the "Acad. des Sci." (vol. cvii, 662, 1888), if hypobromite of sodium containing an excess of alkali be boiled with hippuric acid, gaseous bullæ are disengaged, and the liquid clouds with a reddish-yellow tint. The precipitate, which goes down on cooling, appears as a powder of a kermes-red color. Benzoic acid under like conditions gives no reaction. Glycocol causes a decoloration of the hypobromite, with a disengagement of azotic gas. Testing the action of hypobromite of sodium upon a large number of azotized products of the aromatic series, the following results were obtained: *Benzamide* and *Benzonitril* gave nothing when cold; on ebullition, gave a kermes-red precipitate. *Aniline;* the aqueous solution—even when largely diluted—gave an orange precipitate; the reaction was nearly as sensitive as that of the hypochlorite of lime. *Methylaniline;* a yellow precipitate slightly greenish when cold, but becoming red on boiling. *Toluidine;* same results as for aniline; the precipitate is browner. *Anilides;* nothing with cold; on boiling a reddish precipitate. An odor of cyanide of methyl is disengaged. *Hydrochlorate of diamine-metaphenylene, diamido-benzoic acid, diamine-toluilene;* all gave—hot or cold—a red maroon precipitate. *Ferrocyanides, ferricyanides, nitro-prussiates;* on boiling, all gave a red precipitate of ferric hydrate. *Pyridine;* no reaction. *Quinoleine;* does not give the orange-red precipitate except—which is frequently the case—aniline is present.—Amer. Jour. Pharm., Jan. 1889, 19; from Jour. de Pharm. et. de Chim., Dec. 1, 1888.

Potassium Bromate—Preparation.—See *Bromates of the Cinchona Alkaloids*, under "Organic Chemistry."

Barium Bromate—Preparation.—See *Bromates of the Cinchona Alkaloids*, under "Organic Chemistry."

IODINE.

Iodine—Volumetric Estimation in Presence of Chlorine and Bromine.—According to N. McCulloch, iodine may be estimated in the presence of bromine and chlorine by the following method: The solution is mixed with its own bulk of strong hydrochloric acid, and 20 to 30 fluid grains of chloroform. Standardized permanganate is dropped in, with agitation, until the iodine color at first produced in the chloroform is again discharged owing to the formation of colorless iodine monochloride.—Amer. Drugg., Sept. 1888, 176; from Chem. News.

Iodides—Examination for Nitrate in Presence of Iodate.—According to C. Schwartz the examination of the iodides of potassium or sodium, containing iodate, for nitrate, can be made in the usual way, by use of $FeSO_4$ and H_2SO_4, after boiling 0.5 gm. of the sample with 1 gm. $CuSO_4$, 0.8 gm. Na_2SO_3 and 10 c.c. water, until all of the iodine is precipitated as cuprous iodide, and filtering; the boiling generally requires about one minute.—Phar. Ztg., 1888, 612.

Iodates—Reduction to Iodides.—A very simple method for the reduction of iodates to iodides—also of bromates to bromides, and chlorates to chlorides—has been discovered by H. N. Morse and W. M. Burton. The agent by means of which the change is brought about is zinc amalgam, rich in zinc, prepared by shaking zinc dust with mercury in presence of tartaric acid, and washing with water. The solution of the iodide containing iodate is boiled with the zinc amalgam, when the iodate is reduced, oxide of zinc being formed. Experiments with pure iodate showed that quantities of 1 to 2 gm. in 50 c.c. of water were completely reduced in 45 to 75 minutes, respectively. Bromates and chlorates are also reduced by the same reagent, but with successively increased difficulty.—Amer. Drugg., Jan. 1889, 13; from Am. Chem. Jour.

Iodate of Calcium—Antiseptic Value.—Dr. Klein has studied the antiseptic and disinfectant effects of iodate of calcium, and reports that it is a moderately powerful agent in many cases, though it will not destroy the more resistant spores or bacilli, such as the bacillus anthracis of the blood, the cholera bacillus of Koch, etc., etc. It has, however, this advantage over corrosive sublimate, that it is not poisonous, at least in the quantity in which it would likely be taken if a liquid containing it were accidentally swallowed. A solution of 1 in 500 is sufficiently effective as an ordinary disinfectant, and certainly more powerful than a similar one of carbolic acid.—Amer. Drugg., June 1889, 102; from Brit. Med. J.

FLUORINE.

Fluorine—Occurrence in the Organism.—The experiments of G. Tamman seem to show that fluorine is of greater physiological importance in the animal economy than has been hitherto considered to be the case. Fluorine is well known to occur in ploughed earth and in wells. Horsford found weighable quantities in the human brain, and Salm-Horstman found that certain plants did not fully develop in the absence of fluorine. Mr. Tamman found fluorine in the different parts of the egg, weighable quantities being found in the yolk. In other experiments, brain, cow's milk, and blood, were found to contain small weighable quantities of the element.—Amer. Drugg., Sept. 1888, 174; from Zeitsch. Physiol. Chem.

Hydrofluoric Acid—Apparatus for Inhalation.—Several apparatuses for hydrofluoric acid inhalation, such as Bardet's, Bergeson's, Petit and Filleau's, Dupont's, and others, are described in Amer. Drugg., July 1888, 126.

PHOSPHORUS.

Phosphorus—Improved Process of Manufacture.—Nicolle has devised the following improved process for the manufacture of phosphorus: the mineral phosphate, either natural or artificial, is treated with nitric acid, and then, on the addition of sulphate of potassium, the calcium is precipitated as sulphate, which is removed by filtration. A proper quantity of mercurous nitrate is now introduced, and the resulting phosphate of mercury is distilled with carbon, when mercury first distils over, and then phosphorus.—Amer. Drugg., Aug. 1888, 154.

Hypophosphites—The Blue Color Reaction with Molybdate Operative only in the Presence of Sulphurous Acid.—E. J. Millard observes that, in common with many others, he has never been able to get a blue precipitate with ammonium molybdate and hypophosphorous acid or a hypophosphite, this being one of the reactions of the two substances given in several text books. Only a faint coloration appears after standing considerable time, nor does the fact of the solution of the molybdate being acid, neutral or alkaline, make any difference in the result. Whilst experimenting in this direction, however, he noticed that the addition of a small quantity of sulphurous acid rendered the inoperative test a most delicate one. Moreover, the ordinary nitric acid solution of molybdate of ammonium, used as a test for phosphoric acid, answers even better than a neutral or alkaline solution. For, if to a solution of hypophosphorous acid or any of the hypophosphites the acid solution of ammonic molybdate be added, and then a few drops of sulphurous acid, a blue precipitate is immediately formed, or if the solution be dilute, a blue coloration is produced which is considerably intensified by agitation or gentle warming. Phosphoric acid and the phosphates, phosphorous acid and the phosphites, similarly

treated do not react, neither do pyrophosphates. The reaction is, the author believes, due to the partial reduction of MoO_3 to Mo_2O_8 by the hypophosphorous acid, which is completed by the sulphurous acid. This blue oxide has been shown by Pfordten to exist between colorless MoO_3 and brownish MoO_2. In pure solutions the reaction is very delicate, it being possible on gently warming to detect 1 part of H_3PO_2 in 2000, whilst the well-known cupric reaction fails completely.—Am. Jour. Pharm., March 1889, 129; from Phar. Jour. and Trans., Jan. 26, 1889, 585–586.

Phosphoric Acid—Improved Manipulation for its Estimation.—When phosphoric acid is determined by means of ammoniacal solution of chloride of ammonium and sulphate (or chloride) of magnesium, the resulting crystalline precipitate of ammonio-magnesium phosphate usually adheres with considerable tenacity to the sides of the beaker, etc. Stutzer observes that this may be avoided by adding to the liquid, before it is stirred, a few shreds of chemically pure, ash free filter paper. These shreds are prepared by agitating pieces of the filter paper in a bottle with water of ammonia, so as to produce a thick magma.—Amer. Drugg., Aug. 1888, 149; from Chem. Zeit.

Phosphoric Acid—Volumetric Determination.—Carl Schindler describes a method for the volumetric determination of phosphoric acid, for the execution of which the following solutions are required: (1) Molybdic acid. To 1 litre of molybdic solution prepared as usual there are added 30 c.c. of a solution containing 500 grms. citric acid per litre. (2) Strong solution of ammonium nitrate containing 750 grms. NH_4NO_3 per litre. (3) Dilute solution of ammonium nitrate containing 100 grms. NH_4NO_3 per litre and 10 c.c. HNO_3. (4) Magnesia mixture (Fresenius). (5) Solution of lead of which 1 c.c. represents 0.04 grm. P_2O_5. It is prepared by dissolving 55 grms. lead acetate in 1 litre water, and standardizing with any solution of phosphoric acid of known strength. (6) Solution of ammonium molybdate, of which 1 c.c. corresponds to 1 c.c. of the lead solution. It is obtained by dissolving 25 grms. ammonium molybdate in 1 litre water, and standarizing with solution 5. (7) Solution of tannin. About 0.1 grm. tannin is dissolved in 20 to 30 c.c. water. This solution is always to be prepared afresh before use. The analysis is performed as follows: 50 c.c. of the nitric solution of phosphoric acid, representing 0.5 grm. of the substance, are mixed with so much of No. 2 that the liquid, after precipitation, contains—

$$\text{Vol. of No. 2} = \frac{\text{Vol. of phosphoric acid} + \text{Vol. of No. 6}}{2}$$

So much of No. 1 is then added that 100 c.c. come to 0.1 grm. P_2O_5. The whole is then heated on the water-bath to about 58°, let settle for five to ten minutes, and the supernatant liquid is filtered off. If the filtrate is heated to a higher temperature, there generally appears a further deposit

of ammonium phosphomolybdate, but so minute in quantity that it may be neglected. The precipitate is washed three or four times by decantation with about 50 c.c. of dilute solution of ammonium nitrate, and dissolved in a beaker with liquid ammonia at 3 per cent. The solution is then placed in a ¼-litre flask, adding the rinsings of the filter (with the same solvent); 10 to 20 c.c. of the magnesia mixture are added, the flask is filled up to the mark, shaken up, and the liquid is filtered through a dry filter. Of this filtrate 50 c.c. are measured off, the liquid is made up to 300 or 400 c.c. with boiling water, and so much of the lead solution (No. 5) is then added from a burette that there may remain in solution a small excess of the lead (0.5 to 1 c.c.), titrating back with the ammonium molybdate solution.—Chem. News, Aug. 3, 1888, 61; from Zeitsch. f. Analyt. Chem., xxvii, Part 2.

Phosphoric Acid—Determination by Means of Uranium Nitrate.—Charles Malot utilizes the property of uranium nitrate to form a lake with cochineal, to indicate the end of the reaction in determining phosphoric acid. When the preliminary operations have been carried so far that the ammonium-magnesium phosphate exists dissolved in dilute nitric acid, some drops of an aqueous solution of cochineal are added, and then so much dilute ammonia that the color appears just violet. This color is then again removed by one or two drops of nitric acid. The liquid is now heated to 100° and mixed with 5 c.c. of a solution of sodium acetate, and the solution of uranium nitrate is then dropped in with a burette. Each drop, on falling, produces a greenish-blue color, which disappears again on stirring, until the last drop turns the whole mass of the fluid a permanent green. No uranium can then be detected in the solution. The reaction is, therefore, very distinct, and permits of the determination of phosphoric acid in great dilution.—Chem. News, Aug. 17, 1888, 85; from Zeitsch. f. Analyt. Chem., xxvii, Part 1.

Phosphoric Acid—Determination in Basic Slags.—C. Brunnemann recommends the following process for the determination of phosphoric acid in basic slags: Digest 10 grms. slag with 30 to 50 c.c. of water in a beaker holding 400 to 500 c.c.; 80 to 100 c.c. of strong hydrochloric acid are added, 50 c.c. of nitric acid, and lastly 10 c.c. of strong sulphuric acid, and the liquid is boiled for thirty to forty-five minutes. The hot liquid is then poured into a litre flask containing about 400 c.c. of hot water, and the beaker is rinsed out with hot water. The solution is diluted to about 900 c.c. to dissolve any calcium sulphate which has separated out, let cool, filled up to the mark, and let settle; 50 c.c. of the clear liquid are then taken and evaporated on the water-bath until the excess of nitric and hydrochloric acid is expelled. The free sulphuric acid is cautiously neutralized with dilute ammonia until the residue in the capsule takes a brown color. It is now evaporated to dryness, heated in the air-bath for half an hour to 110° to separate silica, 10 c.c. strong nitric acid are poured

upon the residue, stirring well with a glass rod; 40 to 50 c.c. of boiling water are added; the liquid is filtered, the filter washed, and in the solution the phosphoric acid is determined by the molybdenum method. This method determines both the phosphorus present as phosphoric acid and that existing as phosphide.—Chem. News, Aug. 31, 1888, 108; from Zeitschr. f. Anal. Chem., xxvii, Part II.

Phosphoric Acid—Separation from Tungstic Acid and Determination.—F. Kehrmann suggests the following method for the separation and determination of phosphoric and tungstic acids: 1½ to 2 grms. of the compound (free acid or alkaline salts) are mixed with double the volume of the calculated quantity of caustic soda and a sufficiency of water, and boiled for half an hour in a covered porcelain or silver capsule. The clear solution, when cold, is mixed with twice the quantity of ammonium chloride, which will furnish chlorine to combine with the alkali present, placed in a beaker, and, after adding one-fourth of the volume of ammonia, precipitated with magnesia-mixture. After standing for twelve hours it is filtered and washed with dilute ammonia to which a little ammonium nitrate has been added. To remove any traces of alumina and traces of ferric oxide, the ammonium-magnesium phosphate is again converted into Sonnenschein's precipitate. The ammoniacal filtrate containing the tungstic acid is evaporated down upon the water-bath in order to expel the free ammonia, and separated from the tungstic acid by desiccation with hydrochloric acid repeated at least four times. The tungstic acid is then perfectly washed by decantation with water acidified with a little nitric acid and mixed with a little ammonium nitrate, ignited at a dull red heat until the weight becomes constant, and weighed.—Chem. News, Oct. 12, 1888, 184; from Zeitschr. f. Anal. Chem., xxvii., part 3.

Meta-Phosphoric Acid—Transformation in Presence of Acids and Alkalies.—Paul Sabatier finds that the transformation of meta-phosphoric acid is more rapid in the presence of the strong mineral acids, such as the sulphuric and hydrochloric, while organic acids, such as the acetic, retard the phenomenon. With very small doses of sulphuric acid the accelerating influence is apparently null, or even negative at low temperatures. The more rapid destruction of the metaphosphoric acid is doubtless due to the temporary formation of dissociable hydrates, produced by the acids at the expense of the metaphosphoric acid. If saturated with an alkali, the transformation of the metaphosphate into acid phosphate is imperceptible at 0°, very slow at 43.5°; prolonged boiling effects a complete transformation. In a liquid partially saturated we find the transformation slower than in the free acid, but more rapid than in an acid completely saturated. These results confirm the hypothesis formed as to the constitution of vitreous metaphosphoric acid. The chief reaction is a splitting up, which is effected less easily when the acid

is saturated with a strong base.—Chem. News, May 10, 1889, 229; from Compt. Rend. April 15, 1889.

BORON.

Boron—Convenient Method of Preparation of the Element and its Compounds.—Messrs. Gattermann, Harris and Maisch, have succeeded in preparing boron and some of its compounds conveniently and cheaply by a method analogous to that by which they prepared silicium and its compounds (see below). An intimate mixture of 1 part of powdered magnesium and 2 parts of previously melted and powdered borax is placed into a hessian crucible, the mixture covered with a layer of borax to exclude air, the crucible sealed with clay, and heated for a short time in a coal-fire. The product of the reaction is washed with warm water, then boiled with concentrated hydrochloric acid to remove magnesium oxide, the residue washed on a filter and dried. The gray-brown product of reaction now contains, besides boron, as principal constituent, also some boron-nitrogen and magnesium compounds, which are removed by heating in a charcoal crucible with aluminium. The boron is then obtained in form of graphite-like handsome six-sided plates.

Boron trichloride is obtained from the powdered crude boron by passing chlorine through it at a gentle heat. Excess of chlorine is removed from the product by agitation in the cold with some mercury.—Arch. d. Pharm., March 1889, 276; from Ber. d. D. Chem. Ges., 1889, 186.

Boron—Preparation from Boron-Fluoride.—S. G. Rawson recommends the following method for the preparation of boron as more convenient than the usual method—fusion of metallic sodium and boric anhydride. A mixture of 3.5 grms. B_2O_3 and 11.0 grms. CaF_2 is taken and treated in a flask with concentrated sulphuric acid. A continuous stream of boron fluoride can be readily obtained by gently warming the flask. The gas is then passed through a piece of hard glass tubing on which three or four bulbs have been blown, and in each of which a little potassium has been placed. The bulbs are heated in turn, decomposition occurring with the formation of potassic fluoride and liberation of boron. The mass is then thrown on to a filter and can be readily and completely washed, leaving the boron behind. The experiment is also an interesting one to show on the lecture table, from the easy and rapid manner in which the boron is set free.

Silicon.—The author observes that silicon fluoride treated in a similar manner also readily decomposes, depositing silicon as a brown amorphous powder, from which the fluoride of potassium can be removed by washing, first with cold and subsequently with hot water. Considerable quantities of boron and silicon can be thus obtained in a very short time.—Chem. News, Dec. 14, 1888, 283.

Borates of the Alkaloids—Use in Collyria.—See under "Organic Bases."

SILICIUM.

Silicium—Economical and Convenient Method of Preparing the Element and its Compounds.—L. Gattermann, in conjunction with Harris and Maisch, has determined a method whereby silicium and boron (which see above), as well as their halogen derivatives, are easily and cheaply obtained in quantities. The method depends upon the use of powdered magnesium as reducing agent, quartz sand and borax being readily reduced by it. To prepare *silicium*, an intimate mixture of 10 grams powdered magnesium and 40 grams of powdered and well dried quartz are heated strongly in a thick walled test-tube. The product of the reduction is a gray-black mass of crude *silicium magnesium*, which is readily removed from the tube, and reduced to powder, and is the starting point for the different silicium compounds.—When

Crystallized Silicium is desired, a quantity of the grey powder is placed into a crucible, a piece of zinc is introduced, and, the crucible being sealed with clay, it is heated in a moderate coal fire to the melting point of the zinc. On subjecting the mass to the action of dilute hydrochloric acid, the zinc and magnesium are dissolved, and the silicium remains in form of handsome needle-shaped crystals.

Silicium chloride is obtained by passing chlorine gas at a moderate heat through the above mentioned grey product of reaction.

Silicium bromide is obtained in the same way, substituting bromine vapor for chlorine.

Silicium chloroform is obtained by first washing the grey product of reaction with dilute hydrochloric acid to remove magnesium oxide, then washed with water, dried and treated with dry hydrochloric acid gas. The crude silicium chloroform ($SiHCl_3$) is purified by fractional distillation.

Silicium bromoform is obtained in an analogous manner.—Arch. d. Phar., March 1889, 275–276; from Ber. d. D. Chem. Ges., 1889, 186.

Amorphous Silicon and Silicon Hydride—Methods of Preparation.—H. N. Warren, requiring a somewhat large quantity of amorphous silicon, made use of the following ready method of preparing the same, namely, by the action of gaseous silicon fluoride upon metallic magnesium, contained in an ordinary combustion tube, and heated by the aid of a gas flame. The products being amorphous silicon, magnesium fluoride, and a small quantity of a peculiar form of magnesium silicide, which, when exposed to the action of the more concentrated acids, and especially hydrochloric, evolved a most spontaneously inflammable silicon hydride; this, when in contact with the atmosphere, takes fire with explosive vio-

lence, the nature of its combustion resembling in every respect that of phosphoretted hydrogen. The same gas may, however, be obtained free from spontaneous inflammability by reacting on the above-mentioned compound with the weaker acids, such as acetic and oxalic, but the difficulty arising from freeing it from uncombined hydrogen gas renders it impossible to speak definitely, although from various experiments that have been performed with the same, it would appear to be closely allied to hydric phósphide, and to be a mixture of silicon hydride, both in the gaseous, liquid, and solid form.—Chem. News, Nov. 2, 1888, 215–216.

CARBON.

Carbon—Property Resembling that of Platinum Sponge.—G. A. Hirn having blown out the flame of a spirit-lamp, and put on its glass cover, saw accidentally a few moments afterwards that a point of the wick still remained glowing. One of the carbonized points was incandescent for nine hours over the extent of a square millimetre.—Chem. News, July 13, 1888, 24; from Compt. Rend., cvi, No. 26.

Carbon Monoxide—Detection in the Air.—C. de la Harpe and F. Reverdin determine the presence of carbon monoxide in the air by passing it, previously filtered, through glass-wool or cotton, over pure dry iodic acid, heated to 150°, and then into starch dissolved in distilled water. The carbon monoxide passes into the state of dioxide, a corresponding quantity of iodine is set at liberty, and the solution of starch is colored blue. The operation is most conveniently conducted by putting the iodic acid into a small fractionation flask, the delivery tube of which has been bent down so as to plunge into a small bottle containing the solution of starch. The flask is set in an oil-bath and air is let arrive in a moderate current at the bottom of the apparatus. Other reductive bodies, such, e. g., as sulphuretted hydrogen, must first be removed by known methods.—Chem. News, March 8, 1889, 120; from Bull. Soc. Chim., 1889, No. 3.

Carbonic Acid—Volumetric Determination.—Leo. Vignon observes that carbonic acid in an aqueous solution, whether free or combined with the neutral carbonates, rapidly decolorizes the red liquid formed by mixing 50 c c. of lime water and 10 drops of a saturated alcoholic solution of pure phenolphthalein. Hence it results that carbonic acid dissolved in water, free or in a state of semi-combination, can be determined volumetrically by means of a standard solution of calcium hydroxide, using, under suitable conditions, phenolphthalein as an indicator. The details of the process are as follows: 50 c.c. of the water in which the carbonic acid is to be determined are mixed with 0.05 c.c. (10 drops) of a saturated alcoholic solution of phenolphthalein, and there is gradually added to the liquid lime-water which has been previously standardized (by means of decinormal sulphuric acid and cochineal) until it takes and retains the

rose shade which is characteristic of phenolphthalein in presence of an excess of lime. In order to obtain constant results, it is necessary to compare the final tint with that of a liquid of the same composition as the water to be examined, but perfectly free from carbonic acid. As a type there may be used either water distilled, or a portion of the water under examination, which has been boiled long enough to expel all carbonic acid. The presence of calcium and magnesium chlorides, sulphates, and nitrates does not affect the results. Calcium carbonate, indeed, colors phenolphthalein slightly, but, besides that this coloration is not comparable in intensity to that yielded by free lime, it is not manifested in presence of carbonic acid.—Chem. News, Dec. 21, 1888, 298; from Bull. Soc. Chim., 1888, 903.

Carbonic Acid.—Value as an agent for sterilizing *Medicinal Solutions*, which see under "Pharmacy."

Carbonic Acid—Use in Freezing Mixtures.—According to the experiments of L. Cailletet and E. Colardeau, compressed or porous solid carbonic anhydride alone, under atmospheric pressure, gives a temperature of about —60°; in a vacuum maintained by means of a pump and potash the temperature is —76°. A mixture of ether and solid carbonic anhydride has a temperature of —77° under ordinary pressure, and —103° in a vacuum. This mixture solidifies liquid carbonic anhydride. When solid carbonic anhydride is added to ether, it at first disappears rapidly, not owing to volatilization, but because it dissolves in the ether. The ether remains transparent, but after some time bubbles of gaseous carbonic anhydride are given off. If further quantities of the anhydride are added, the liquid becomes saturated, and loses its transparency. The temperature gradually falls until it attains a minimum exactly at the point of saturation. Any further addition of the anhydride causes no further reduction of temperature, but the liquid becomes more and more turbid. It is evident that the effect of the ether is due to its solvent action on the carbonic anhydride. Other solvents producing low temperature with the anhydride are methyl chloride, —82°; sulphurous anhydride, —82°; amyl acetate, —78°; phosphorus trichloride, —76°; alcohol, —72°; and ethylene chloride, —60°. The temperature of mixtures of carbonic anhydride with methyl chloride or sulphurous anhydride in a vacuum is so low that the solvent solidifies, and the temperature of the mass remains constant from this point. With methyl chloride the temperature obtained is —106°. A mixture of carbonic anhydride and chloroform becomes solid under ordinary pressure, and has a temperature of —77°. —Jour. Chem. Soc., Oct. 1888, 1025; from Compt. Rend., cvi, 1631–1634.

Bisulphide of Carbon—Purification.—Ignatius Singer, after describing the methods and apparatus used in making bisulphide of carbon, and making some general remarks respecting its purification, gives the fol-

lowing process for purifying this article: A cylindrical vessel, about thirty inches in diameter and six feet high, is provided with a perforated coil pipe of lead at the bottom. Into this vessel run the bisulphide to be purified to about one-third in height. Then pump lime water into it, the latter being introduced into the vessel by means of a force pump, through the perforated coil. The lime-water, being specifically lighter than the bisulphide, rises to the surface, and, while traversing the body of the bisulphide in a finely-divided spray, the lime combines with the hydrosulphuric acid, etc. Continue this washing until the lime-water which leaves the vessel through an overflow pipe near the top, is perfectly clear. The bisulphide is now run into a still, about one per cent. of its weight of a cheap, colorless oil is added, and covered with a layer of about one inch of water, to which some acetate of lead may be added. The bisulphide is now distilled in a water-bath, and condensed in the usual way. A very pure product is obtained in this manner.—Amer. Drugg., April 1889, 64; from Jour. Soc. Chem. Ind., 1889, 96.

Carbon Disulphide—Occurrence as a Normal Constituent of Vol. Oil Mustard, which see under "Organic Chemistry."

Oxysulphide of Carbon—Preparation, etc.—Armand Gautier recommends the following convenient and rapid method for preparing oxysulphide of carbon: A large porcelain tube, filled with kaolin that has been dried at an incipient red heat, is carefully heated in a suitable oven to bright redness. The air is first expelled by dry carbonic acid, and then a current of vaporized dry bisulphide of carbon is passed through the tube. A gaseous mixture is thus produced containing, besides traces of sulphuretted hydrogen and carbonic acid, from 60 to 64 per cent. of oxysulphide of carbon and 35 to 39 per cent. of carbonic oxide. It is purified by passing it successively through ice water, solution of potassa, solution of cuprous chloride, 12 per cent. alcoholic solution of anilin, and through a column of pumice stone fragments saturated with sulphuric acid. After rapidly passing this series, the gaseous oxysulphide may still retain small quantities of carbonic oxide, alcohol and moisture, from which it is freed over mercury by cuprous chloride, dry potassium hydrate, and finally by sulphuric acid. Pure oxysulphide of carbon has a faint lye-like, ethereal odor, is slowly absorbed by soda solution, with separation of faint yellow, needle shaped and tabular crystals of sodium thio-carbonate. These are partially decomposed by water according to the equation: $2CSO_2 NaH + H_2O = CO_3NaH + NaHS + CO_2 + H_2S$.—Arch. d. Phar., May 1889, 473; from Jour. de Phar. et de Chim., 1889, xix, 122.

CYANOGEN COMPOUNDS.

Mercuric Cyanide—Antiseptic Action.—Chibret has made comparative experiments upon the antiseptic action of mercuric cyanide and mercuric

chloride, and communicates his results in a comprehensive report. The only practical result of his laborious experiments consists in the observation that in the antiseptic treatment of wounds the solution of the cyanide (1:5000) produces a more complete asepsis than does a corrosive sublimate solution of the same strength, and that it possesses the further advantage of producing less irritation of the tissues—Arch. d. Pharm., Nov. 1888, 1042; from Jour. de Pharm. et de Chim., 1888, xviii., 265.

Mercuric Oxycyanide—Value as a Substitute for Corrosive Sublimate.—It is stated in "Merck's Bull." that hydroxycyanide of mercury is destined entirely to supplant corrosive sublimate. In not attacking the metal of surgical instruments when used for disinfecting them, it is superior to that salt. In disinfecting bacterialized peptone fluids, it shows six times the bactericidal power of corrosive sublimate. The report of Stellden as to the successful use of the simple cyanide in diphtheritic cases has already been given (see above).—Amer. Drugg., Feb. 1889, 36; from J. Soc. Chem. Ind.

Sulphocyanhydric Acid—Occurrence in Different Animal Fluids.—Although the occurrence of sulphocyanhydric acid in the saliva has long been known, its occurrence in other animal fluids has hitherto not been noticed. Braylants has now determined its presence in a number of animal secretions, such as milk, gall, blood, and urine. In the latter, for instance, he has determined the presence of 0.00292 grams of sulphocyanhydric acid per litre.—Arch. d. Pharm., Oct. 1888, 901–902; from Jour. de Pharm. et de Chim., 1888, xviii., 153.

Sulphocyanide of Potassium—Presence and Removal of Iron.—J. Kranzfeld observes that commercial sulphocyanide of potassium is not infrequently contaminated with ferrous oxide, its presence not becoming evident by the color of the preparation until after prolonged exposure to light and air. To remove the iron he recommends the solution of the contaminated salt in dilute alcohol, to add a few drops of sulphide of ammonium to the solution, to filter, evaporate, and finally crystallize over sulphuric acid.—Arch. d. Pharm., April 1889, 319; from Pharm. Zeitsch. f. Russl., 28, 68.

Soluble Blue—Preparation of the Ordinary and the Pure Article.—Guignet communicates the following formula for preparing

Ordinary Soluble Blue.—A solution of 70 grams of ferrous sulphate in hot water is gradually added to a boiling solution of 110 grams of ferricyanide of potassium, the mixture is boiled for two hours, and then filtered. The precipitate is then washed with distilled water until the washings begin to assume a deep blue color, when it is dried at 100°. In this formula the ferricyanide is nearly twice that necessary for the precipitation of the iron; the washings are therefore saved, and will serve for

the precipitation of 70 grams more of ferrous sulphate if 55 grams of ferricyanide are first added. The product is easily soluble in water, and its deep blue solution will bear the admixture of large quantities of gelatin without being precipitated.

Pure Soluble Blue is prepared as follows: Purified Prussian blue (the above preparation? Rep.) is added in excess to a saturated solution of oxalic acid. The filtered liquid is allowed to stand for two months, during which time all of the coloring matter is precipitated and the supernatant fluid has become colorless. The precipitate is collected, washed with weak alcohol to remove oxalic acid, and dried. The product is easily soluble in water. The same may be obtained more rapidly by precipitating the solution in oxalic acid by 95 per cent. alcohol, or by a concentrated solution of sodium sulphate, washing the precipitate with weak alcohol, and drying. If pure soluble blue is boiled with oxalic acid, ordinary insoluble blue is precipitated.—Arch. d. Pharm., May 1889, 476–477; from Jour. de Pharm. et de Chim., 1889, xix., 248.

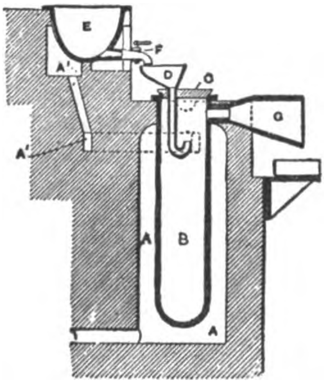
ALKALIES.

Ammonia—Production in the Course of Purification of Crude Alkali.—T. T. Mathieson and Jos. Hawlisczek observe that the compounds of cyanogen formed in the fusion of soda or potassa on the Leblanc process are commonly eliminated either by heat or by oxidation with an alkaline nitrate. In either case the nitrogen is lost. The authors instead treat the product of the fusion with steam at 300° to 500°. The nitrogen is thus liberated as ammonia, and may be collected in the usual manner. The crude soda, as taken from the revolver, is rapidly broken up and placed in the apparatus where it is to be steamed. It is let cool down to 300° to 500°, as at higher temperatures the ammonia is destroyed, and superheated steam is introduced. When the ammonia ceases to escape the temperature is raised to 550° to 650°, and steam is again introduced, when the sulphur compounds are introduced in turn and the sulphuretted hydrogen evolved is collected and utilized in the regeneration of sulphur, or for any other purpose.—Chem. News, Oct. 12, 1888, 185; from Monit. Scient. Quesn., August 1888.

Sodium—Improved Process of Manufacture.—C. Netto describes an improved process, which consists in extracting sodium by the intimate mixture of charcoal and soda, the greatest possible surface of contact between the two reagents being obtained in order that the sodium shall be liberated. The apparatus required is shown by Fig. 33. The charcoal or coke introduced into retort B, which is in the shape of a vertical cylinder, is brought into a state of incandescence, and a spray of liquid caustic soda is then allowed to come in contact with it. The extensive area of the surface of the coke or charcoal induces an immediate generation of sodium vapor, which afterward escapes through an opening

into a condenser. In the accompanying figure the charcoal or coke is charged into the retort B, which is suspended in the furnace A. The soda is liquefied in the vessel E, which is built in the upper furnace A[1], and is

FIG. 33.



Apparatus for Preparing Sodium.

heated by the gaseous products from the furnace A, and is supplied to the retort through D. The sodium vapor escapes through the opening G, into the condenser. Any caustic soda which may happen to have been unaffected by the charcoal collects at the bottom of the retort, together with any carbonate of soda which may be formed by the reaction. These deposits are removed after a time, and are regenerated for future use. No air is allowed to enter the retort, so that the risk of an explosion is obviated.—West. Drugg., April 1889, 118.

Soda Manufacture—General Reactions and Quantity of Heat Consumed.—G. Lunge finds that the Leblanc process to effect the separation of hydrochloric acid and sodium hydroxide in an aqueous solution employs fifteen times the quantity of heat which is theoretically necessary for resolving sodium chloride into sodium and chlorine. Apparently the ammonia process is more economical in this respect, but it is only in appearance, since it furnishes neither free chlorine nor hydrochloric acid, and if we add to the process the manufacture of these latter products, the total consumption of fuel will certainly not be less than that of the Leblanc process. The energy required to effect the separation of sodium chloride into its elements is only a fraction of that which is consumed in the form of heat in the two processes at present in use. Hence it might be believed that the electrolytic decomposition might be effected by burning a much smaller quantity of coal, sufficient to produce the needful sum of chemical energy in the form of electricity. Unfortunately this is not the case in practice. The useful work obtained by the intervention of electricity costs at present much more than the indirect means of decomposition now in use. This is owing to the losses of energy in the boilers,

the steam-engine, the dynamo, to polarization, and other causes not yet understood. The manufacture of soda by electricity, by the conversion of the current into chemical energy, is one of those problems which the future will certainly solve. Neither the Leblanc nor the Solvay process is industrially perfect. As regards the complete utilization of the materials employed, the Solvay process is certainly more rational than that of Leblanc.—Chem. News, Sept. 14, 1888, 132; from Monit. Scient. Quesn., July 1888.

Sodium Biarbonate—Interference of Ammonia Salts, if present, with the Mercuric Chloride Test for Normal Carbonate.—C. Arnold states that sodium carbonate of English manufacture is chiefly made by the ammonia-soda process, and contains ammonium salts in varying amounts; attention is called to the fact that ammonium salts interfere seriously with the mercuric chloride test for the normal carbonate, a white precipitate of mercurammonium chloride appearing first, and only after fifteen to thirty minutes the red precipitate characteristic of the carbonate.—Amer. Jour. Phar., May 1889, 248; from Pharm. Ztg., 1889, 198.

Sodium Bicarbonate—Analysis of Commercial Sample.—Hermann M. J. Schroeter observes that the Pharmacopœia directs two kinds of bicarbonate of sodium: "Sodii bicarbonas" and "Sodii bicarbonas venalis." The commercial article, as produced now on a large scale and found in the market, is believed to be quite pure and is used very extensively. If the commercial product is found to be sufficiently pure to be used for most purposes, it would obviate the direction of two kinds by the Pharmacopœia. It is also believed that the commercial article is in most cases used by the pharmacist, and by some exclusively. The object of his analysis is to show the difference existing between the commercial and the chemically pure article as now obtainable in the market. Whether any of the commercial products respond to the requirements of the pure, will be shown; and also whether the commercial kind is sufficiently pure for most purposes. The results with sixteen samples are tabulated by the author as follows:

$NaHCO_3$ . .	95.68	96.30	92 69	94.92	95.19	94.43	94.92	97.44	95.72	94.43	95.65	94.59	96.41	94.28	92.44	94.85
Na_2CO_3 . .	2.45	2.10	4 50	3.52	2.00	3.58	2.99	1.88	2.98	2.57	2.95	3.79	2.37	4.25	4.91	3.15
$NaCl$	0.50	0.34	0.60	0.16	0 19	0.04	0.51	0.12	0.33	0.14	0.17	0.05	0.20	0.30	0.02	0.04
Na_2SO_4. . .	0.40	0.38	0.54	0.07	0.05	0.67	0.22	0.05	0.12	0.02	0.01	0.03	0.02	0.13	0.55	0.57
NH_4HCO_3 .	. . .	. . .	. . .	. . .	1.00	. . .	. .	. . .	. . .	1.70	. . .	. . .	. . .	. . .	. . .	. . .
Moisture. . .	0.89	0.83	1.57	1.27	1.55	1.24	1.26	0 47	0.77	1.07	1.13	1.48	0.92	0.99	2.00	1.33
	99.92	99.95	99.90	99.94	99.98	99 96	99.90	99.96	99.92	99.93	99.91	99.94	99.92	99.95	99.92	99.94

It appears from this that the commercial bicarbonate contains on an average 3.21 per cent. of normal carbonate. The Pharmacopœia allows

for the commercial bicarbonate about 5 per cent. of carbonate, and for the pure a limit of 3 per cent. Accordingly the commercial product is almost equal to the requirements of the pure, and the majority of the samples responded to same, showing the superiority of the commercial product now in the market.—Amer. Jour. Pharm., Dec. 1888, 602–606.

Sodium Disulpho-persulphate—A New Compound.—According to Villiers, the sodium salt of a new sulphur acid is produced when sulphurous acid is caused to act upon hyposulphite of sodium. The new compound has the composition $S_4O_8Na_2$, and may be obtained in crystals free from or containing water of crystallization. The anhydrous salt is permanent, melts at 125° C., and is decomposed at 140° C., according to the equation: $S_4O_8Na_2=SO_4Na_2+S_2O_4+S$. The hydrated salt is decomposed at the ordinary temperature, more rapidly when heated with formation of trithionate and elimination of sulphurous acid.—Arch. d. Pharm., Sept. 1888, 798; from Jour. de Pharm. et de Chim., 1888, xviii, 52.

Lithium—Determination in Mineral Waters.—Carnot recommends the following method for the determination of lithium in mineral waters: After removing all the components of the water with the exception of possibly the three alkali metals, by well known methods, fluoride of ammonium is added, and the fluoride of lithium that separates after several hours is collected, dried and weighed, a compensation of 0.001 gram of fluoride of lithium being made for each 3.5 c.c. of filtrate. To establish the purity of the fluoride of lithium produced, it is heated to low redness, whereby the last traces of fluoride of ammonium are removed, and then converted into sulphate. This being weighed, it should amount to 2.115 p. for every 1 p. pure fluoride of lithium. It being possible, however, that small quantities of both fluoride of sodium and of fluoride of potassium have been precipitated with the fluoride of lithium, it may be advisable to reprecipitate the lithium as fluoride, and proceed as before.—Arch. d. Pharm., Dec. 1888, 1131–1132; from Jour. d. Pharm. et d. Chim., 1888, xviii, 385.

ALKALINE EARTHS.

Barium Sulphide—Preparation for the Production of Pure Sulphuretted Hydrogen.—Clemens Winkler prepares barium sulphide for the generation of pure non-arseniferous sulphuretted hydrogen, from 100 parts heavy spar, 25 parts of coal dust, and 20 parts of common salt. The two former ingredients are finely ground, the salt is added, and the whole made up with a little water into a ball, which is rammed into a crucible of 25 c. m. in height and 10 c. m. in width. When dry some coarse coal is laid above the mass, the lid is put on, luted down, except a small vent-hole, and heated for some hours to incipient whiteness. The heat is then let go down, the crucible taken out of the furnace, and let cool quickly. The barium sulphide must be preserved in stoppered bottles in

a dry place. With dilute hydrochloric acid it yields a very regular current of sulphuretted hydrogen, free from arsenic.—Chem. News, July 27, 1888, 48; from Zeitschr. f. Anal. Chem. xxvii, No. 1.

Barium Sulphite—Insolubility in Hydrochloric Acid.—C. Rattenbury Hodges observes that many text-books state that barium sulphite is soluble in hydrochloric acid. Having occasion recently to test a sample of sodium sulphite for traces of the sulphate, with barium chloride in the usual way, he found the precipitate did not dissolve in HCl. This result evidently pointed to the presence of a sulphate, but the following experiments made by the author seem to prove very conclusively that barium sulphite is not soluble in hydrochloric acid.

(1) To a solution of $BaCl_2$ he added a solution of sulphur dioxide and obtained a white precipitate, also insoluble in HCl, whether dilute or strong. On boiling, the precipitate remained undissolved; but in this case it seemed likely that some sulphuric acid had come over with the sulphur dioxide (for the latter had been prepared by reducing H_2SO_4 with copper), and that the test was therefore unreliable.

(2) Sulphur dioxide gas obtained by warming crystals of sodium thiosulphate with strong HCl, was passed into a fresh solution of barium chloride, and the result was the same, a precipitate of barium sulphite insoluble in HCl.

(3) Another sample of sodium sulphite in crystals was warmed with HCl, and the gas thus evolved was passed into $BaCl_2$. In this case also, on addition of HCl, the precipitate did not dissolve.

The hydrochloric acid in these experiments was free from sulphuric acid.—Chem. News, Sept. 14, 1888, 128.

Barium Sulphite—Solubility in Hydrochloric Acid.—G. Stillingflat Johnson, doubting the correctness of Mr. Hodges' conclusions drawn from his above mentioned experiments, has made the following experiments which throw further light upon the subject:

I. A clear solution of barium hydrate (baryta water) is boiled to expel dissolved oxygen, and sulphur dioxide gas (obtained by the action of hydrochloric acid upon sodium sulphite) is passed into the solution. A copious precipitate results. On adding a few drops of hydrochloric acid, free from H_2SO_4 and HNO_3, this precipitate is at once and completely dissolved.

II. A solution of barium chloride is boiled, to expel dissolved oxygen, and pure sulphur dioxide gas is passed into the solution. No precipitate is formed, or only a faint opalescence, which is not dissolved by hydrochloric acid. *Prolonged* boiling is necessary to ensure complete absence of precipitate, but saturation with the gas produces no turbidity if this precaution has been taken.

III. A solution of barium chloride, made with unboiled water, is sat-

urated with sulphur dioxide gas. A precipitate is produced, which is quite insoluble in hydrochloric acid.

The conclusions drawn from the above experiments are as follows:

1. Pure barium sulphite is readily and completely dissolved by hydrochloric acid.

2. Pure barium chloride in aqueous solution is not precipitated by pure sulphur dioxide gas.

3. Barium chloride in aqueous solution is precipitated by sulphur dioxide in presence of dissolved oxygen, the precipitate being barium sulphate, not barium sulphite.

$$BaSO_3+O=BaSO_4.$$

It will be remembered that oxygen converts 13½ times its weight of barium sulphite into barium sulphate.—Ibid, Sept. 28, 1888, 155.

Calcium—Separation from Barium and Strontium.—Prof. Kupferschlaeger, after criticizing other methods for the separation of calcium from barium and strontium, describes his own process as follows: The mixture of calcium, barium and strontium carbonate is treated with very dilute nitric acid and evaporated to dryness. The residue is taken up in pure water, and the solution, filtered and quite neutral, is evaporated to complete dryness. The three nitrates which constitute this product are successively exhausted by four successive small portions of absolute alcohol, each time a little more ethereal than the former. This is done in a small well-stoppered flask, which is often shaken, the solutions are filtered after standing long enough to become clear, not longer. When the last portion of ethereal alcohol leaves nothing on spontaneous evaporation, the calcium nitrate is separated from the two others. These, after being well dried, are dissolved in water, and to the solution placed in a small tall narrow glass is added solution of potassium dichromate, saturated in the cold: in this manner the barium is thrown down on chromate. The precipitate, after washing with water containing a little alcohol, is then heated with sulphuric acid to convert it into barium sulphate. The liquid containing the strontium is mixed with dilute sulphuric acid and heated moderately, so as to throw down the strontium sulphate.—Chem. News, August 3, 1888, 60; from Bull. Soc. Chim., 1888, No. 9.

Phosphorescent Calcium and Strontium Sulphides—Preparation.—Edmond Becquerel observes that by the calcination of pure calcium carbonate and sulphur a calcium sulphide is produced, which possesses phosphorescent properties only in a slight degree; but if traces of carbonate of sodium or of nitrate of sodium are added to the calcium carbonate previous to calcination, the resulting calcium sulphide possesses a lively green fluorescence. The addition of a manganese or bismuth salt in place of the sodium salt has the effect of producing only faintly or non-phosphorescent products; but the addition of ¼ to 1 per cent. of sodium

carbonate to a calcium carbonate containing manganese or bismuth, produces yellow or blue phosphorescent calcium sulphides. By the simple calcination of oyster-shells, strongly red-phosphorescent products are often obtained. With calcium carbonate containing $\frac{1}{1000}$ of rubidium carbonate and not more than $\frac{1}{2000}$ of soda, a sulphide is produced which, taken from the center of the crucible, shows intense fire-red phosphorescence, while that from the sides has a green phosphorescence. On reheating the whole again, the compound only shows green phosphorescence.

Sulphide of Strontium exhibits similar properties to the calcium sulphide. In its pure condition it produces with sulphur non-phosphorescent, or but faintly greenish-blue phosphorescent sulphides; but by the addition of soda, or better of 2 per cent. of lithium carbonate, a bright green-phosphorescent compound is formed. The addition of antimonium sulphide also influences the formation of fluorescent sulphides of strontium; rubidium carbonate determines a green phosphorescence.—Arch. d. Pharm., May 1889, 473–474; from Jour. de Pharm. et de Chim., 1889, xiv, 118.

Heavy Calcined Magnesia—Fraudulent Compound.—Attention is called by Messrs. Keasby and Mattison to an article called and offered in the market as "English Heavy Calcined Magnesia," which analysis proves to be composed almost wholly of gypsum, the following being the analytical result given:

Calcium sulphate	79.00
Water	20.70
Magnesium oxide	30.00

Amer. Jour. Pharm., March 1889, 121–122.

Magnesium Ammonium Phosphate—Use of Alcohol to Facilitate its Separation.—Rose states that water containing 3 per cent. of ammonia gas dissolves only traces of the precipitate, and that this solubility is reduced to less than half if to the dilute solution of ammonia one-fourth of its volume of alcohol is added, and, further, that the addition of alcohol favors the separation of the precipitate. A. I. Wakeman, in order to test the method, which he says appears to have been neglected by analysts, has made a series of comparative analyses under identical conditions, with the exception that some of the precipitates were washed with ammonia solution, according to the ordinary method, and the remainder with ammonia solution containing alcohol. The results of his experiments point to a slight advantage in the use of alcohol in diminishing the solubility of magnesium ammonium phosphate when the precipitate is somewhat bulky. The use of alcohol, moreover, appears to make the precipitate more compact, so that it is more easily washed, and is less liable to creep up the sides of the funnel. The addition of alcohol to the solution in which the precipitation takes place is not advantageous, as it causes the

precipitate to attach itself more closely to the beaker, so as to be difficult of removal, and it also retards the filtration.—Jour. Chem. Soc., Oct. 1888, 1131; from Techn. Quarterly, Boston, I, 173–177.

ALUMINIUM.

Aluminium—Improved Process.—The process of H. T. Castner, it is claimed, will reduce the cost of producing sodium to one-fifth and of aluminium to one-third the present prices. It has recently been shown in full operation to a number of scientists. The manufacture resolves itself into four stages: (1) the production of sodium under the Castner patents; (2) the production of the necessary supply of chlorine by the Weldon process; (3) the manufacture of the double aluminium and sodium chloride by a new process, invented and patented by Mr. Castner; and (4) the reduction of this double chloride by means of sodium. The first capital improvement is in the production of sodium from caustic soda. The reduction is effected by means of iron carbide in steel retorts, and at the relatively low temperature of 800° instead of 1500°, as in the old process: 1 lb. of sodium is obtained from 6 lbs. caustic soda, and 5 lbs. of the iron carbide. The saving in fuel, in wear and tear, and in time, is such that, whilst sodium formerly cost 6s. per lb., it is now produced at about 9d. There is no need for us to enlarge on the benefits of cheap sodium, irrespective of the manufacture of aluminium.

The double aluminium and sodium chloride is formed by passing chlorine gas over a mixture of alumina, salt and carbon, placed in large retorts of a peculiar construction and heated to a high temperature. The chloride formed distils over, and is caught in special condensers. The plant admits of the daily production of 6000 lbs. double chloride, containing about 12 per cent. of aluminium, and yielding in practice 10 per cent. Here again a considerable economy is effected.

The last stage, the extraction of the aluminium, is effected in furnaces, each of which receives a charge of 80 lbs. of the double chloride, 25 lbs. of sodium, and 30 lbs. of cryolite, which acts as a flux. The charge is heated for two hours to about 1000°, and yields about 8 lbs. of aluminium, the impurities in which do not exceed 2 per cent.

The daily output of sodium is expected to reach 1500 lbs., that of aluminium being 500 lbs. The entire daily production in the world has hitherto been estimated at about 50 lbs.—Chem. News, Aug. 10, 1888, 64–65.

Alumina—Separation of Glucina.—A. Zimmermann has examined the methods hitherto proposed for the separation of alumina and glucina, and finds the results partly uncertain and partly quite useless. The best method is the use of pure potassium hydroxide, in which, if in excess, glucina dissolves in the cold and is again deposited on boiling. A volume of 300 c.c. solution, containing 0.3 grm. of substance, allows of a perfect separation. If the liquid is much diluted, alumina falls along

with glucina. Caustic soda is not applicable.—Chem. News, July 27, 1888, 48; from Zeitschr. f. Anal. Chem., xxvii, Part I.

Aluminium Sulphate—Detection of Free Sulphuric Acid by the Application of Pettenkofer's Bile Reaction.—E. Egger finds that Pettenkofer's bile reaction is admirably adapted to the detection of free sulphuric acid in aluminium sulphate, alum, etc. This reaction is obtained when an aqueous solution of chloic acid is heated with sugar and strong sulphuric acid, when there appears a cherry-red solution, becoming purple, and afterwards bluish red. The author finds that 1 c.c. of a mille-normal sulphuric acid=0.00004 grm. SO_3, if heated in the water-bath with a granule of cholic acid and two drops solution of furfurol (1 drop furfurol in 10 c.c. water) leaves a distinct red stain on the sides of the porcelain capsule in which the solution has been heated or evaporated. In applying this test to alum, 50 grms. of the sample in fine powder are put in a flask, moistened with distilled water, let stand for some hours, covered with a mixture of two parts alcohol and three of ether, shaken well, and set aside. After twenty-four hours the liquid is filtered, the filtrate placed in a capsule, and evaporated down to 1 c.c. on a water-bath, which must be warmed but not boiling. The cholic acid and furfurol are then added and the coloration is then sought for.—Chem. News, April 5, 1889, 169; from Zeitschr. f. Analyt. Chem., xxvii, Part 6.

Alums—Quantity of Water of Crystallization.—Messrs. Lescœur and Mathurin remark that alums are generally considered as containing twenty-four equivalents of crystalline water. This is contested by Mr. Maumené, who ascribes to potassium alum as much as twenty-nine equivalents. Mr. de Boissieu has undertaken to re-determine the crystalline water of potassium and chromium alums, and has obtained results ranging between 23.6 and 24.1 equivs. As the methods which he employed seemed open to objection, the authors have taken up the question anew, and conclude that the products analyzed contain 24 equivs. of water. Further researches proved that the specimens analyzed were not mixtures, but perfectly definite compounds not altered by efflorescence.—Chem. News, Nov. 2, 1888, 220; from Bull. Soc. Chim., July 5, 1888.

Porous Alum—Preparation.—The following method for making "porous alum" is recommended in "Farm. Ital.": Make a solution free from iron, and concentrate it in an evaporator; add minute quantities of bicarbonate of sodium and stir briskly. The carbonic acid gas gives the required porosity to the crystalline mass.—Amer. Jour. Pharm., Nov. 1888; from Arch. de Phar., Oct. 5, 1888.

Aluminium Chloride—Vapor Density and Molecular Weight.—C. Friedel and J. M. Crafts find that aluminium chloride volatilizes without fusion under the ordinary atmospheric pressure, but it melts easily under a higher pressure. The authors find its melting-point intermediate between 186° and 190°. The boiling-point at 0.33 atmosphere is 167.8°,

but at 3.60, 213°. The vapor density at different temperatures ranges from 9.69 to 8.31, the theoretical value being 9.24. The numbers found do not fluctuate greatly over a range of more than 200°, and agree fairly well with those obtained by H. Sainte-Claire Deville and Troost (9.35 in the vapor of mercury and 9.349 in the vapor of sulphur. MM. Nilson and Petterson, who began their experiments only at 440°, obtain a decidedly lower value.—Chem. News, July 13, 1888, 24; from Compt. Rend., cvi., No. 26.

Green Ultramarine—A Distinct Chemical Compound.—The investigations of R. Hoffmann, K. Heymann and others, have conclusively proven that *blue* ultramarine is a single body of definite chemical constitution. Not so, however, with respect to *green* ultramarine, the question whether it be a definite chemical compound, or simply a mixture of various ultramarines, having so far been undecided. I. Szilasi has now studied the question, and has determined by his experiments and results that green ultramarine, like blue ultramarine, is a regular chemical compound. He has prepared the silver, lead and zinc compounds of green ultramarine, and found that the sodium in the latter compound is not alone replaced by the respective metals in equivalent proportions, but that the new metallic ultramarines produced may again be converted into the green (sodium) ultramarine: thus, for example, the silver ultramarine was so reconverted by heating it with iodide of sodium.—Arch. d. Phar., June 1889, 554; from Liebig's Annal. d. Chem., 1889, 251, 97.

YTTRIUM.

Yttrium—Preparation and Characters of Some Compounds.—A. Duboin has prepared and describes several compounds of yttrium.

Yttrium oxide, in crystals, is obtained by melting the amorphous oxide, obtained from the oxalate, with chloride of calcium.

Yttrium silicate was obtained by heating a mixture of 3 parts of pure yttrium-earth, 1 part silica and 3c parts of chloride of calcium for two hours. When the melted mass has cooled it is treated with water, and monoclinic crystals of $SiO_2 Y_2O_3$, analogous to the natural "gadolinit" are obtained.

Yttrium chloride, anhydrous and crystalline, was obtained by the action of a mixture of chlorine and carbon oxide upon yttrium earth. It is very fusible, volatile, and easily soluble in water, forming the hydrate$=Y_2Cl_6$, $12H_2O$.

Yttrium Bromide was obtained in an analogous manner.

Sodium-Yttrium Sulphide, Na_2S, Y_2S_3, was obtained by the action of a current of sulphuretted hydrogen upon a mixture of yttrium and sodium chloride heated to 1000°. It constitutes translucent greenish tabular crystals, which are not decomposed by cold or boiling water.—Arch. d. Phar. May 1889, 471; from Compt. rend., 1888, 107, 99 and 243.

CERIUM.

Cerite Metals—Separation and Compounds.—Ouvrard has endeavored to obtain new salts of cerium, lanthanum and didymium by acting upon the oxides of the metals with alkaline phosphates. The cerium oxide was completely free from lanthanum and didymium by fusing the nitrates in ten times their weight of saltpetre. Lanthanum oxide, separated from didymium by Marignac's method, was free from cerium, and its concentrated nitric solution did not present the absorption-bands of didymium. After ignition in the air lanthanum oxide remained perfectly white. Cerium and lanthanum yield, by the reactions employed, products absolutely identical in crystalline form and chemical composition, differing merely in color. The didymium oxide employed was free from lanthanum, but it had not been treated for the separation of other oxides which it might contain, such as samarium. Its equivalent was very close upon that given by Cléve for pure didymium (71). Didymium behaves with the potassium phosphates like those of cerium and lanthanum, giving under approximate conditions either tribasic didymium phosphate or a double phosphate.—Chem. News, July 20, 1888, 36; from Compt. rend., July 2, 1888.

MANGANUM.

Manganese—Volumetric Method of Determination.—A. Ghilian proposes the following volumetric method of determining manganese: The hydrochloric solution of the substance containing the manganese in the manganous state diluted with boiling water is poured into an Erlenmeyer flask holding from 900 to 1000 c.c., and mixed with an excess of zinc oxide suspended in water. The liquid is made up to 500 to 600 c.c. by means of boiling water, and the standard solution of permanganate is slowly dropped in from a Mohr's burette, agitating after each division, and causing the oxides to settle by slanting the flask. The color of the clear supernatant liquid shows the precise moment when it is colored by an excess of permanganate. From the volume of permanganate employed the proportion of manganese is calculated. In the treatment of irons, steels, Bessemer metal, and ores whose proportion of manganese does not exceed 3 to 4 per cent. the author uses a solution containing 4 gms. permanganate per litre, the value of which is 0.000213 per $\frac{1}{10}$ c.c. (*i.e.*, for one division of the burette). A solution of double the strength is employed for the determination of spiegels, ferro-manganeses, and rich ores. Its value is 0.000426. Twenty-five such assays may be executed in half an hour. The zinc oxide employed ought to be the kind obtained by precipitation. During the operation the liquids should be kept at about 80°.—Chem. News, March 8, 1889, 121; from Rev. Univ. des Mines et. de la Metall., Sept. 1888.

Manganese—Determination by Hydrogen peroxide.—Prof. Jos. Klein

calls attention to peroxide of hydrogen as a sensitive reagent for manganese. In alkaline solutions it at once produces a precipitate of peroxide of manganese, evidenced in the presence of minute quantities of a manganese salt (sulphate for instance) by a dark color. To the liquid to be tested chloride of ammonium is added in such quantity that the addition of ammonia shall produce no precipitate. The latter having been added, it is followed by peroxide of hydrogen, when precipitation of hydrated peroxide of manganese immediately follows.—Arch. d. Phar., January 1889, 77–79.

Manganese—Determination in Steel.—Frank Julian suggests the following method for determining manganese in steel: One gm. of metal is dissolved in 15 c. c. of nitric acid (sp. gr. 1.2), evaporated down to 5 c. c.; 20 c. c. of strong acid are added, and the liquid is precipitated in heat by potassium chlorate, avoiding a large excess. There are then added successively to the mixture 5 c. c. of strong nitric acid, 60 c. c. hot water, and 10 c. c. of the oxalic solution. The liquid is agitated until it takes a light yellow color, and the excess of oxalic acid is titrated by means of permanganate, operating at a temperature of about 70°. The manganese dioxide dissolves rapidly under the influence of oxalic acid; the back titration is done quickly, and the end of the reaction is easily found after a little experience. The solutions employed are: Ammonium oxalate at 15 gms. per litre. Potassium permanganate at 1.6 per litre. To determine the standard of the permanganate we take 10 c. c. of the solution of oxalate, add 50 c. c. of hot water, and the nitric solution of 1 gm. of steel, from which the manganese has been eliminated by precipitation with potassium chlorate and separating the precipitate with an asbestos filter.—Chem. News, Oct. 26, 1888, 207; from Rev. Universelle de Mines et de la Metall., 1888, No. 3.

Permanganate of Potassium—Solubility.—Charles M. Bradbury in the course of an investigation of the constitution of the permanganates, made a series of careful experiments to redetermine the solubility of permanganate of potassium in water, and his results deviate more or less from those formerly obtained.

He finds at 0° C. and 5° C. and between these degrees, the results obtained were extremely uniform, no matter what method of producing a saturated solution was employed. Above 5° C. there was a slowly increasing degree of variation in the results according as the method of making a solution was changed. Nevertheless, below 35° C., the results were not materially different. Above this temperature, however, the difficulties increased. The method employed by the author to produce the saturated solutions upon which the final results were based, was the following:

A flat porcelain dish, about 6 c.m. deep and 25 c.m. in diameter, was covered outside with cotton-wool and heavy paper, and fitted with a

wooden cover. The permanganate was placed in a small beaker, in sufficient quantity to insure saturation of the solution, and the beaker was immersed in the bath in the dish through an opening made in the cover to fit it. The temperature of the bath was shown by a thermometer, introduced through the cover, and that of the solution by another suspended in it. Starting at 0° C., the temperature was gradually raised by removing the ice and adding warm water, till 30° C. was reached; from which point the increase was continued by the aid of a jet of steam led through the cover into the bath. At every 5° rise in the temperature of the solution, 5 c.c. were removed to a weighed vial, which was then set in a steam-bath to evaporate. The solution was stirred, and then given time for the undissolved salt to subside, previous to the removal of each sample.

Following are some of the results obtained:

100 C.c. of the saturated solution of the salt contain

At	Gm. of salt.
0° C	3.0
5° C	3.3
10° C	4.0
15° C	4.9
20° C	5.8
40° C	10.6
50° C	13.7
75° C	22.8
90° C	28.6
95° C	32.8

Amer. Drugg., May 1889, 86; from Chem. News, March 29, 1889, 149–152.

FERRUM.

Iron—Cobalt Nitrate a Test.—F. P. Venable has noticed that if to a solution of cobalt nitrate in strong hydrochloric acid, which is blue, a little iron is added, the color is changed to green. This reaction is very simple, rapid and delicate for detecting traces of iron, and is especially useful in testing strong acids for its presence. The delicacy of the test is such that when even $\frac{3}{100000}$ of a gm. of ferric salt are added to the blue strongly acid solution mentioned above, the green is clearly given. With a somewhat larger amount this green is quite vivid. If too much of the ferric solution is used, the cobalt solution becomes pink from the addition of water. The test is not given by ferrous salts, nor does the presence of ferrous salts interfere with it.—Chem. News, Oct. 12, 1888, 178; from Jour. Analyt. Chem., I, part 3.

Ferric Hydrate—Insufficiency as an Antidote for Arsenic, which see.

Metaferric Hydrate—A New Hydroxide of Iron.—According to Pesci a new ferric hydroxide, probably metaferric hydrate, is produced when a solution of potassium nitrite is poured into one of ferric chloride;

nitric oxide escapes, and a flocculent red-brown substance is deposited, which, when well washed, is soluble in pure water, forming yellowish-red solution, transparent by transmitted light, turbid by reflected light. This solution reacts quite different from solutions of ferric salts. With ferrocyanide of potassium, and with tannin, it produces brown precipitate or coloration; is not changed by sulphocyanide of potassium, but is coagulated by alkalies, acids, or alkali salts. On boiling it becomes turbid, and brown flocks are separated which redissolve on cooling. The solution reacts acid with phenolphthaleïn and rosolic acid, and it remains unchanged for a long time. The composition of the new compound is represented by the formula $Fe_2O_2(HO)_2$.—Arch. d. Phar., August 1888, 750–751; Ann. di Chim. e di Farm., 1888, 305.

Dried Sulphate of Iron—Commercial Quality in England.—George Lunan observes that the dried sulphate of iron of commerce does not commonly contain the percentage (97.5) of $FeSO_4.H_2O$ required by the B. P. He has examined nineteen different samples, and found them to vary not only very materially in color, from nearly white, with greenish tint, to gray and dark gray, but also that with one exception, they all contained less than the required quantity of ferrous sulphate, the average being about 89 per cent.—Pharm. Jour. and Trans., Sept. 22, 1888, 226–227.

NICKEL AND COBALT.

Cobalt and Nickel—Decomposition.—In a communication to the Chemical Society of Munich, Dr. Krüss announced that he has succeeded in decomposing the well-known metals cobalt and nickel. He found in each of these metals an unknown substance to the extent of 2–3 per cent. After this new body is eliminated, cobalt or nickel—as the case may be—still remains, though with modified properties. The salts of pure cobalt, or new cobalt, are said to be of a violet color, and those of pure nickel of a dark green. Dr. Krüss was occupied with redetermining the atomic weights of cobalt and nickel; to this end he treated carefully weighed portions of cobalt or of nickel with a neutral solution of gold chloride, and weighed the gold which was eliminated. The results of these operations were not constant, and after various other attempts to detect any possible source of error, the gold deposited was closely examined. It was found that after having been dissolved in nitro-hydrochloric acid and reduced with sulphur dioxide there was a loss of weight, and that the washing waters had a green color. On concentration these washings gave a colorless liquid, which turned greeen on the addition of hydrochloric acid, and gave a white deposit on the addition of caustic soda or ammonia, insoluble in the former.

As these reactions could not belong to cobalt or nickel, Dr. Krüss sought to procure a larger quantity of the unknown material. He

ignited freshly precipitated cobalt or nickel oxide with caustic alkali, extracted the melt with water, and obtained a solution possessing the characters above mentioned, though the pure nickel oxide or cobalt oxide was left undissolved. The solution on treatment with ammonia gave a bulky precipitate of hydroxide. On ignition this yielded a white oxide, giving a brown malleable metallic powder by reduction with charcoal. From the solution ammonium sulphide threw down a deep brown sulphide, soluble in acids. From these reactions the presence of a new metal was inferred. Dr. Krüss is engaged with a further investigation of this substance as well as with a re determination of the atomic weights of nickel and cobalt.—Chem. News, Jan. 18 and 25, 1889, 29 and 39.

Nickel and Cobalt—Separation from Iron by an Old Method.—J. B. Mackintosh revives the old method for the separation of nickel and cobalt from iron, depending on the different behavior of the sulphides with dilute hydrochloric acid. He throws down the metals from a boiling solution with ammonium sulphide, and treats with dilute hydrochloric acid. In this manner is obtained a residue containing nearly all the nickel and cobalt, with mere traces of iron, and a solution containing almost all the iron, with but small quantities of nickel and cobalt. The iron is separated in the well-known manner as a basic salt both from the residue and the solution, an operation which is easier and more expeditious than the separation of the three metals by direct basic precipitation. —Chem. News, Oct. 26, 1888, 208; from Zeitschr. f. Analyt. Chem. xxvii., No. 4.

Nickel—Volumetric Estimation.—Thomas Moore describes a volumetric method for the estimation of nickel which is based on the results of a large number of experiments, and which he finds at once sufficiently rapid and accurate for all practical purposes. The following solutions are required for the process: Potassic cyanide (pure); 25.5 gm. per litre. 20 c.c. of this are equal to about 0.1 grm. nickel. Cupric ferrocyanide: dissolve 2.25 gms. of cupric sulphate in one litre of water, and add a solution of potassic ferrocyanide until it ceases to produce any further precipitation. Thoroughly agitate before use. The process is carried out as follows: If the solution contains much free ammonia, as in the filtrate from iron and nickel separation, neutralize part of it by addition of hydric chloride; if acid, add ammonia until strongly alkaline, then run in the potassic cyanide from a burette, stirring continually until the blue color completely disappears and the solution takes a yellowish tint; when this happens add a measured quantity of cupric ferrocyanide sufficient to impart a distinct color to the solution; the amount required for this purpose is variable and depends upon the free ammonia present; now add the cyanide more cautiously, until finally one drop causes a distinct change of color in the solution. A little practice is necessary to recognize the change, but after a few trials no difficulty will be experienced.

The amount of cyanide necessary to decolorize the copper salt is so small that it may often be neglected; but if desired, the error may be eliminated by ascertaining how much cyanide is necessary to decolorize 100 c.c. of the copper solution, and reckoning out the difference in the usual way. Of course it is first necessary to standardize the cyanide solution with one of nickel of known strength. The process gives equally good results in the presence of sulphates, nitrates, chlorides or acetates, also in the presence of large quantities of ammoniacal salts; but large quantities of free ammonia should be avoided, owing to the solubility of the cupric ferrocyanide therein.—Chem. News, April 5, 1889, 160.

Cobalt—Deposition in the Metallic State.—To deposit metallic cobalt upon other metals, H. N. Warren directs that the cobalt salt, preferably the chloride, be dissolved in a sufficiency of water at a temperature of about 100° F., and a concentrated solution of Rochelle salt added until the bulky precipitate at first formed has almost entirely re-dissolved. The solution, filtered if necessary from any insoluble precipitate, is electrolysed with the utmost ease by connecting the article intended to receive the deposit with the negative electrode of any single-cell battery. The opposite, or positive electrode, which is composed of a zinc rod immersed in a solution of either ammonium chloride or common salt, and protected from contaminating the cobalt solution by the intervention of a porous pot surrounding the zinc. On completing the circuit the cobalt is immediately deposited in a uniform layer, and at the same time presenting a perfectly bright surface. On substituting nickel chloride in place of the cobalt salt, metallic nickel may be similarly deposited.—Chem. News, Feb. 8, 1889, 64.

INDIUM.

Chlorides of Indium—Preparation and Characters.—L. F. Wilson and O. Petterson have prepared three chlorides of indium.

Indium Trichloride, $InCl_3$, was obtained by the action of chlorine upon metallic indium, as also by heating the bichloride in an atmosphere of chlorine. Its vapor density is normal, at 606° to 850°.

Indium Bichloride, $InCl_2$, was obtained by heating gaseous hydrochloric acid with metallic indium as an amber yellow fluid, which congealed to form a crystalline mass. It is split by water into indium trichloride and metallic indium. Its vapor density is normal at high temperatures.

Indium Monochloride, InCl, is obtained by carefully heating an excess of metallic indium in gaseous hydrochloric acid, a dark-red fluid being formed. It may also be obtained by heating the bichloride with metallic indium.—Arch. d. Pharm., May 1889, 472; from Bull. Soc. Chim., 1889, No. 1, 43.

CHROMIUM.

Chromic Oxide—Detection and Determination.—E. Donath and Rud. Jeller propose the following method for the detection and determination of small quantities of chromic oxide: The solution, containing small quantities of chromic oxide along with an excess of ferric oxide, alumina, manganous oxide, and possibly alkaline earths, is allowed to flow into a hot solution of sodium carbonate mixed with permanganate. After a short ebullition the excess of permanganate is reduced by the addition of a few drops of alcohol and filtered. Ferric oxide, alumina, manganese, and the alkaline earths are precipitated, whilst the chrome remains in solution in the state of chromic acid in the filtrate, which will have a yellowish color if the quantity of chrome is at all considerable. If the color is not perceptible and the liquid appears colorless, the filtrate is slightly concentrated, acidulated with dilute hydrochloric or sulphuric acid, and a drop of it is applied to a fragment of starch which has been previously moistened with a fresh prepared solution of potassium iodide. The appearance of a violet color betrays the presence of chromic acid. If the filtrate was perceptibly yellow it gives the well-known iodine reaction on acidulation with hydrochloric acid and addition of potassium iodide and a little carbon disulphide. For the quantitative determination of very small quantities of chrome the authors proceed quite in the same manner, but the solution is dropped slowly from a pipette into the hot alkaline solution of permanganate, and the liquid is heated for ten minutes. The filtrate, after acidulation with hydrochloric acid and the addition of a little alcohol, is heated, and chromium sesquioxide is precipitated in the usual manner with ammonium sulphide.—Chem. News, March 1, 1889, 109; from Zeitschrift für Analytische Chemie, vol. xxviii, part 1.

Chromic Acid—Action on Hydrogen Peroxide.—Berthelot states that if hydrogen peroxide is brought in contact with chromic acid in presence of a powerful mineral acid, such as sulphuric or hydrochloric acid used in excess, there is first produced the blue coloration of perchromic acid, followed by a slow escape of oxygen. The chromic acid is converted into chromic sulphate. Feebler acids, such as acetic and phosphoric, produce, with chromic acid and oxygenated water, a purple or violet coloration, due to a mixture of perchromic acid and of a brown compound. With more feeble acids, such as boric and hydrocyanic acids, the liquid merely turns brown. With pure potassium dichromate oxygenated water is decomposed to an indefinite extent. After the liquid, which at first turns brown, has resumed its original color, on the addition of a fresh dose of oxygenated water the brown color reappears. In twenty-four hours one equivalent of potassium dichromate has thus been found to decompose 40 equivalents of oxygenated water. At the end of the experiment the solution of dichromate retains its original composition,

and contains no trace either of perchromic acid or of chromium oxide.—Chem. News, Feb. 22, 1889, 97; from Compt. rend., Jan. 28, 1889.

In continuation of his above experiments, Mr. Berthelot finds that the unlimited decomposition of oxygenated water by potassium dichromate is due to the formation of an intermediate compound, which is incessantly formed and reproduced. This intermediate compound, which turns the liquid brown, has some such composition as $nCrO_3,Cr_2O_3+3H_2O_2$.—Chem. News, March 29, 1889, 157; from Compt. rend., March 11, 1889.

ZINCUM.

Zinc—Quantitative Determination.—Max Bragard observes that in separating zinc in the presence of nickel from its solution in formic acid, the solution must be sufficiently acid to prevent the precipitation of nickel by sulphuretted hydrogen, the addition required being 5 c.c. formic acid (sp. gr. 1.1136) to 0.03 gm. nickel. The free acid must not exceed a certain limit if the zinc is to be thoroughly precipitated. But if increased acid is required by a large quantity of nickel, the solution must be diluted to 500 to 600 c.c. If the precipitation is to be effected in heat, more acid is required than for a cold solution. If the zinc sulphide is contaminated with nickel sulphide, the precipitate is re-dissolved in hydrochloric acid, the sulphuretted hydrogen expelled, ammonia and formic acid are added, and a fresh current of sulphuretted hydrogen is passed through the liquid. Zinc can be separated in the same manner from iron, more free formic acid being used, and the volume of the liquid increased. The precipitation of zinc in a citric solution presents no advantage, the precipitate being exceedingly difficult to filter and to wash.

The author has also examined Tamm's determination of zinc as ammonio-phosphate. He finds this method most successful if 0.2 to 0.4 zinc is contained in 400 c.c. solution, and if the precipitate is allowed to stand for twenty-four hours. To prevent the precipitate from running through, the washing water should have at first the same temperature as the filtrate, and should be made hotter by degrees. He endeavored to weigh the precipitate as pyrophosphate. He finds that a volatilization of zinc may be avoided if the precipitate is heated alone, at first with a small flame, gradually made stronger so as to exclude the reducing action of the flame gases. Very strong heating should be avoided. To prevent the reductive action of the carbon from the filter, the precipitate is filtered in the smallest possible filter, from which it is carefully separated when dry. The paper is then carefully burnt separately, after being moistened with ammonium nitrate. Zinc may be separated from magnesia by precipitation with sodium phosphate and excess of ammonia, provided the quantity of magnesia is not too large. Manganese can be separated in this

manner from zinc only if in small proportion.—Chem. News, Aug. 17, 1888, 84; from Zeitschr. f. Analyt. Chem., xxvii., Part I.

Zinc—Separation and Determination.—J. Riban overcomes the difficulties usually encountered in the determination of zinc in the moist way, by a process which consists in transferring the zinc salt into a soluble hyposulphate by the addition of an alkaline or earthy hyposulphate and treating it *in the cold* with sulphuretted hydrogen. There is formed a pure amorphous zinc sulphide, so dense that it soon collects at the bottom of the liquid, whilst the supernatant liquid remains clear, notwithstanding the movement produced by the gaseous current. As this precipitate is formed, dithionic acid is set free, but its action upon zinc sulphide is very slight, and even null in dilute solutions, so that at certain degrees of dilution the process is at once expeditious and very accurate. The precipitate may be separated from the supernatant liquid by simple decantation, and can then be easily washed by continued decantation and filtration. The liquid containing the salt of zinc is saturated with sodium carbonate until a permanent precipitate appears, and is then re-dissolved by a few drops of dilute hydrochloric acid. To this slightly acid liquid there is added an excess of sodium or barium hyposulphate, more than sufficient to effect the double decomposition with the salt of zinc and the free acid; an excess of the hyposulphate does no harm. The liquid is diluted with water so that it may contain, at most, 0.1 gm. zinc in 100 c.c. There is then passed into it a current of sulphuretted hydrogen in the cold. The precipitate of zinc sulphide, quite white and very heavy, collects quickly. After letting settle for a few minutes, the limpid liquid is decanted carefully through a filter. Upon the precipitate is poured boiling water and sulphuretted hydrogen water, when the precipitate soon settles again. After two or three such washings by a decantation through a filter, the washing is completed in the filter, always with hot water mixed with sulphuretted hydrogen water. It is dried at 100°, separated as completely as possible from the filter, which is incinerated in a porcelain crucible, after moistening the paper with ammonium nitrate. Lastly there is added to the ash the zinc sulphide and free sulphur, and the whole is ignited in a current of hydrogen according to Rose's process. Or the sulphide may be converted into oxide by roasting.

This method allows of the separation of zinc from the alkaline-earthy and alkaline metals, using for the latter barium hyposulphate in place of the sodium salt.

As iron, manganese, etc., are not precipitated by sulphuretted hydrogen in presence of the hyposulphates, the zinc may be separated from these metals and determined without the previous elimination of iron.—Chem. News, Aug. 24, 1888, 90; from Comptes Rendus (vol. cvii., 341).

Zinc—Separation as Sulphide in Presence of Nickel.—H. Bauligney finds that zinc may be separated from nickel by treatment of the suffici-

ently dilute solution of the sulphates in acetic acid (0.3 gm. of the saline mixture in 100 c.c. of liquid). The salts are dissolved in water containing 100 c.c. of glacial acid per litre, and the liquid treated at the common temperature with sulphuretted hydrogen is let stand two or three hours and then filtered. The deposit is then complete, and is perfectly white. The operation is completed by washing with water containing 10 per cent. of acetic acid and containing sulphuretted hydrogen. The nickel is precipitated from the filtrate in the ordinary manner, raising the temperature to 70°–75°, and then letting it cool in presence of sulphuretted hydrogen in a stoppered flask. The free acid must be *exclusively* acetic acid, which is secured by adding to the liquid ammonium acetate. If we filter when the liquid is clear and cold, all the nickel is separated as a dense sulphide, which is washed with water charged with sulphuretted hydrogen and acidulated with one or two per cent. of acetic acid. The sulphides are then converted into sulphates and weighed after drying at 400°.—Chem. News, Feb. 22, 1889, 88; from Compt. rend., cviii, 236.

Oxide of Zinc—Presence of Arsenic.—Dr. W. Strohmeyer calls attention to the presence of arsenic in two specimens of "pure" oxide of zinc, neither of which would have been found objectionable by the tests of the Germ. Pharm. It seems probable that these samples were not, as they should have been, prepared by the humid method, which would have excluded arsenic, but that they were made by the industrial method of combustion. The test of the Germ. Pharm. should therefore include the determination of the freedom of oxide of zinc from arsenic, possibly by means of passing sulphuretted hydrogen into the acid solution of the preparation, etc.—Arch. d. Pharm., June 1889, 549–550.

Oxide of Zinc—Examination of Commercial Samples.—Mr. Wm. F. Hebsacker examined nine commercial samples of oxide of zinc, and compared them with sample No. 1, prepared by himself, the results being given as follows:

Sample.	Effervescence with acids.	Solution treated with excess of ammon. carb.	Acid solution treated with H_2S.
1	None.	Perfect solution.	No effect.
2	None.	Slight precipitate.	No effect.
3	Slight.	Perfect solution.	Slight precipitate.
4	Slight.	Slight precipitate.	No effect.
5	Slight.	Slight precipitate.	No effect.
6	Strong.	Slight precipitate.	No effect.
7	None.	Slight precipitate.	Slight precipitate.
8	Strong.	Perfect solution.	No effect.
9	Slight.	Slight precipitate.	No effect.
10	Slight.	Perfect solution.	Slight precipitate.

—Amer. Jour. Pharm., Dec. 1888, 608.

Galvanized Iron—Danger in the Use of Vessels made from it.—The Paris Council of Hygiene disapproves the use of galvanized iron vessels for holding or measuring liquids intended for alimentary purposes, on the ground that they offer the danger of rapidly contaminating with zinc most liquids happening to come in contact with them.—Amer. Drugg., Sept. 1888, 176.

CUPRUM.

Copper—Determination of Small Quantities of Bismuth and Antimony.—P. Jungfer determines the presence of small quantities of bismuth and antimony in commercial copper, as follows: He dissolves the copper in nitric acid, dilutes slightly, adds sodium carbonate drop by drop, stirring well, until a slight permanent precipitate has been produced, stirs further for a few minutes, and lets stand for an hour or two in order that any bismuth remaining in solution may have time to undergo double decomposition with the basic copper carbonate deposited. The precipitate is filtered through a small filter, dissolved in a few drops of hydrochloric acid, and diluted with water. The bismuth is then deposited as basic bismuth chloride, which is collected upon a tared filter, dried at 110° and weighed. If a residue appears on dissolving the copper it is filtered off, melted with sodium carbonate and sulphur, and examined for bismuth. For separating small quantities of arsenic and antimony from copper Flajolot proposes a method based on the different behavior of the iodides of the above elements. The copper iodide is almost insoluble in feebly acid solutions in which arsenic and antimony iodides (the latter in the presence of tartaric acid) are readily soluble. Mr. Jungfer has re-examined this method, and finds that along with copper arsenic remains entirely in solution, and that antimony, even in presence of tartaric acid, is partially carried down, and can be removed only by very protracted washing. This objection the author gets over by adding to the solution a little potassium fluoride *before* the potassium iodide; in this manner the copper iodide can be freed from antimony by a short washing, even if the addition of tartaric acid is omitted.

For determining small quantities of antimony in copper, the author dissolves 10 gms. copper in 50 c.c. nitric acid of specific gravity 1.4, dilutes the solution in a large beaker to 200 to 300 c.c., and after adding 150 m. g. of dissolved potassium fluoride, mixes with potassium iodide and sulphurous acid. The precipitation of the copper iodide is effected in the cold by adding the requisite potassium iodide, not at once, but in successive portions alternately with sulphurous acid, avoiding an excess of the iodide. The beaker is set on a boiling water-bath until the precipitate has deposited, the contents are then filtered, and the precipitate is washed by decantation three or four times with hot water containing sulphuric acid. After the excess of sulphurous acid in the filtrate has

been removed by means of solution of iodine, sulphuretted hydrogen is introduced for a long time. The precipitate produced contains, along with arsenic and antimony, a little copper and any lead and bismuth which may be present. The sulphides are filtered off and dissolved in hydrochloric acid with a little potassium chlorate. From the liquid thus obtained, after adding tartaric acid and excess of ammonia, copper, lead, and bismuth may be removed by the cautious addition of sulphuretted hydrogen water. After the precipitate has been gently heated and stirred for a short time it is rapidly filtered, and arsenic and antimony in the filtrate are separated fom each other in the ordinary manner.—Chem. News, July 27, 1888, 49; from Zeitsch. f. Anal. Chem. xxvii., part 1.

Cupric Salts—New Reaction.—Denigès describes a new reaction of cupric salts, which is based upon the easy transformation of the salts of copper to cupric bromide, under the influence of bromide of potassium, and upon the dehydration, by sulphuric acid, of the salt produced, this being manifested—with bromide of potassium in excess—by a fine coloration of violet red. The reaction is very sensitive, and may also be produced in saline solutions of other metals, such, for instance, as nickel and cobalt. To 2 c.cm. of a cold, saturated solution of bromide of potassium, 1 c.cm. of concentrated sulphuric acid is added, and the mixture is agitated; the lower portion becomes yellow, but this color disappears on agitation if the bromide be free from bromate. Then two or three drops of the solution to be tested for copper is added. However small may be the quantity of copper present, a carmine coloration is produced; this brightens with heat, and disappears under the addition of water, which hydrates the cupric bromide. The same action is produced with solid cupric salts. The solution to be tested should first be acidulated with sulphuric acid so as to precipitate the metals, if any, as insoluble sulphates. The reagent may be prepared in advance by adding to a saturated solution of bromide of potassium, half its volume of pure sulphuric acid. This is stirred and filtered through asbestos, so as to separate the sulphate of potash precipitate which forms.—Amer. Jour. Phar., June 1889, 289–290: from Bull. de la Soc. de Phar. de Bordeaux, March 1889.

Copper Salts—Reducing Action of Saccharine Matters.—L. Monnet observes that the various sugars have the property of reducing the copper salts to the metallic condition, if they are applied in concentrated solutions. In neutral liquids the reduction is produced at all temperatures, and heat merely facilitates the operation. The copper is always obtained in a crystalline condition. In alkaline solutions the reduction is effected only at a boiling heat, and the deposit is amorphous. Saccharose acts more easily than lactose or dextrose in neutral solutions; in alkaline liquids the reverse holds good.—Chem. News, Feb. 15, 1889, 85; from Bull. Soc. Chim., 1889, No. 2.

Cuprous Chloride—Preparation from Sulphate by Double Decomposition.—For the preparation of cuprous chloride Denigès heats to a boil in a flask one part each of crystalline copper sulphate and copper turnings, two parts sodium chloride, and ten parts of distilled water. The solution is filtered into 15 to 20 parts of water acidulated with 1 to 2 parts of acetic acid. If the hot liquid is collected separately after filtration and secluded from air, it yields on cooling fine crystals of cuprous chloride.

Cuprous Bromide may be obtained in a similar manner by the aid of potassium bromide.—Chem. News, April 5, 1889, 168; from Compt. rend., March 18, 1889.

Hydrochlorate of Cupric Chloride—A New Compound.—Paul Sabatier has obtained a new compound, the hydrochlorate of cupric chloride ($CuCl_2H_2Cl_2,5H_2O$), in form of hyacinth-red crystals. On exposure to air the crystals promptly lose their hydrochloric acid and leave green opaque needles. The red coloration of this hydrochlorate is an anomaly, since the salts of copper are blue or green. An analogous compound has been obtained with cadmium chloride.—Chem. News, Nov. 2, 1888, 220; from Bull. Soc. Chim., July 20, 1888.

PLUMBUM.

Lead—Volumetric Determination.—Yvon proposes the volumetric determination by the aid of potassium ferrocyanide. Three solutions are required: 1. A normal lead solution made with 15.987 crystalline lead nitrate and water enough to make up 1000 gms. Each c.c. represents 1 centigm. of metallic lead. 2. Semi-normal solution of potassium ferrocyanide made with 10.201 gms. of the crystalline salt, and water to make up 1000 gms. Each c.c. represents a centigm. of lead. The solution of ferric chloride must be so dilute that a drop when deposited upon the porcelain plate is not perceptibly colored. For titrating the ferrocyanide solution the author pours into a large test-glass 10 c.c. of the normal lead solution, and drops in with a burette the ferrocyanide solution, stirring meanwhile with a glass rod. The precipitate deposits rapidly; but it is not necessary to wait until the liquid is clear. When nearly 10 c.c. of the ferrocyanide solution have been added, a series of drops of the ferric solution is placed upon a white plate, and a drop of the mixture is applied to one of these with a glass rod. As soon as a blue color appears the addition of the ferrocyanide is stopped, and the number of degrees consumed is noted. Ten more c.c. of the lead solution are then added, and ferrocyanide is again added until the blue color appears anew. If the process has been properly managed the second number of degrees read off on the burette will be exactly double the first, and the standard of the ferrocyanide solution is thus found.—Chem. News, Feb. 8, 1889, 73; from Jour. de Phar. et de Chim., 1889, No. 1.

Lead—Determination in Tin Alloys.—G. Schwartz proposes the following method for the determination of lead in tin alloys: One gm. of the alloy is rolled out as fine as possible, covered with 20 c.c. of strong hydrochloric acid and heated gently. As a rule, in half an hour the alloy is dissolved, leaving the antimony behind. To dissolve the latter bromine water is added until the liquid becomes yellow, the excess of bromine is expelled by boiling, the liquid diluted to 100 c.c., let cool, and poured, shaking it round, in a thin stream into a solution of 40 gms. commercial crystalline sodium sulphide in 150 c.c. water. After the lead sulphide has subsided, the supernatant liquid is poured through a filter and the precipitate is washed with dilute ammonium sulphide (1 vol. ammonium sulphide prepared with 10 per cent. ammonia and 9 vols. water). The filter and precipitate are put in a porcelain capsule, covered with a funnel, treated with a 10 c.c. nitric acid of sp. gr. 1.5, and as soon as the first violent reaction is over 5 c.c. of strong sulphuric acid. It is then warmed upon asbestos paste-board with a small flame. or until the contents of the capsule have become colorless or pale brownish, let cool, the funnel is spirted out with alcohol at 50 per cent., diluted therewith to 100 c.c., washed as usual, ignited, and weighed. The lead sulphate, after washing, is treated with basic ammonium tartrate, which dissolves everything except traces of lead oxide, which are collected and deducted.—Chem. News, Aug. 31, 1888, 109; from Chem. Ztg., through Zeitsch. f. Analyt. Chem., xxvii, Part II.

Lead—Volumetric Determination as Molybdate.—See *Molybdic Acid.*

Lead—Simple Method of Detection in Water.—Dr. H. Hager recommends the following simple method for detecting the presence of lead in water. An ordinary tumbler is filled two-thirds full of the water to be examined, a teaspoonful of vinegar is added, and two knitting needles, polished brightly and rubbed off with linen—not cotton or wool—are placed into the tumbler crosswise, and allowed to stand 6 to 7 hours at the ordinary temperature. In the presence of lead, the needles will be covered with a gray, lustreless coating, showing here and there black or brown-black spots. When kept for several days in a dry place, free from dust, the gray coating changes to a yellowish or red-yellow.—Arch. d. Pharm., Oct. 1888, 900; from Pharm. Ztg., 33, 372.

Litharge—Impurities.—Th. Sulzer draws attention to two forms of impurity recently observed by him in litharge, viz., basic nitrate of lead and gypsum. The former is probably due to the fact that the litharge was obtained as a by-product in the preparation of nitrites by the action of lead on nitrates. The probable source of gypsum is not mentioned. It is to be remarked that the water used to wash the litharge containing gypsum has a strong alkaline reaction, due to the decomposition of the lime salt and formation of calcium hydrate.—Arch. d. Pharm., Feb. 1889, 125; from Pharm. Centralh., 29, 645.

Peroxide of Lead—Presence and Detection of Manganese.—L. de Koninck draws attention to the occasional presence of manganese in peroxide of lead. This cannot be detected by the ordinary methods. It is necessary to heat a portion of the peroxide with concentrated sulphuric acid to complete decomposition; then, after cooling, to treat the substance with water and a fresh quantity of peroxide, when, on heating, a red solution of permanganic acid is produced if manganese is present. —Arch. d. Pharm., Feb. 1889, 184; from Zeitschr. f. Angew. Chem., 1889, 4.

Lead Dioxide—Use as a Test for Alkaloids.—According to Chem. Ztg. (1889, 95) acetate of brucine in dilute solution with lead dioxide gives after a short time a red coloration; acetate and oxalate of apomorphine in dilute solutions, on addition of lead dioxide or hydrated manganese dioxide, a cherry-red color.

Sulphide of Lead—Removal from Vessels.—The tenaciously adhering coating of lead sulphide from glass or porcelain vessels is easily removed, according to Fischer, by the use of a small quantity of liquor sodæ and some solution of hydrogen peroxide. The process will clean off the oldest concretions in a short time, the sulphide becoming oxidized to sulphate, and this dissolved by the solution of soda.—Amer. Drugg., Aug. 1888, 154; from Pharm. Ztg.

STANNUM.

Tin—Atomic Weight.—S. Bongartz and A. Classen have made some new experiments to redetermine the atomic weight of tin. The determinations, 47 of which were made, were partly by the electrolysis of the double chlorides of tin and potassium, of tin and ammonium, and of tin tetrabromide, and partly by the oxidation of chemically pure tin to stannic oxide. As a mean of their experiments they find the atomic weight of tin to be 118.8 if o=15.96, or 119.1 if o=16.—Arch. d. Pharm., Dec. 1888, 1129; from Ber. d. D. Chem. Ges., 21, 2900.

Tin—Ready Oxidation When Finely Divided.—According to Leo Vignon, tin, which has been precipitated by means of zinc from neutral solutions of stannous and stannic chlorides, is very readily oxidized. If exposed to the air for three or four days, it contains a quantity of hydrated stannous oxide, equal to the fourth or third of its weight. A relatively small quantity of stannous oxide mixed with metallic tin renders it infusible. If tin partially oxidized is heated in contact with the air, it burns without fusing. In a current of inert gas, globules of tin form and remain isolated without coalescing into a regulus. This phenomenon is analogous to that presented by mercury, which remains subdivided in presence of certain impurities.— Chem. News, Nov. 23, 1888, 251; from Comp. Rend., 1888, No. 19.

Stannous Salts—Volumetric Determination.—In the volumetric deter-

mination of stannous salts, Dr. A. Jones titrates with a solution of permanganate made by dissolving 4 to 5 gms. permanganate and 8 to 10 gms. caustic potassa in 1 litre of water. To standardize this test-liquor he measures exactly 5 to 10 c.c. and adds a solution containing exactly 10 gms. of tartar emetic per litre until the green color turns to a light brownish yellow. For the determination 0.2 to 0.4 gm. of tin crystals or half the quantity of metallic tin is dissolved in hydrochloric acid in a current of carbonic acid gas. The solution is made up exactly to 250 c.c. 5 or 10 c.c. of the permanganate liquid are put in a test-glass, and the solution of tin is let flow in gently until the change of color is observed. The liquid must be kept alkaline, and in case of need a few c.c. of caustic potassa must be added. For the calculation we have 1 mol. tin salt = 1 mol. permanganate = 1 mol. tartar emetic.—Chem. News, Feb. 15, 1889, 84; from Chem. Ztg.

Stannous Chloride—Action of Hydrochloric Acid.—According to the observations of Engel, stannous chloride is precipitated from its aqueous solutions by hydrochloric acid in nearly equivalent proportions until the acid preponderates sufficiently, when no further separation takes place. If a current of dry hydrochloric acid is passed over crystallized stannous chloride having the formula $SnCl_2+2H_2O$, partial liquefaction of the crystals results, and new crystals, having the formula $SnCl_2+H_2O$, while the liquid portion has a composition approximating to the formula $SnCl_2+HCl+3H_2O$. The latter may be regarded as a liquid compound of hydrochloric acid and stannous chloride (hydrochloride of stannous chloride) which melts at—27° C.—Arch. d. Pharm., Sept. 1888, 797; Journ. de Phar. et de Chim., 1888, xviii. 76.

VANADIUM.

Vanadates—Salts of the Heavy Metals.—Very little is known respecting the vanadates of the heavy metals. G. Radan has undertaken the study of the neutral and acid vanadates of manganese, nickel, cobalt, zinc, cadmium, and copper, preparing them by double decomposition of the vanadates of potassium and the respective metallic salts.

Normal Potassium Vanadate (KVO_3+H_2O) was prepared for this purpose by melting pure vanadic acid with the equivalent quantity of potassium carbonate. By adding to the solution of the normal salt acetic acid until the solution becomes permanently red, shining red crystals of an

Acid Vanadate of Potassium, of composition $3K_2O.5V_2O_5$, are obtained. This crystallizes in two forms, with 5 and 4½ mol. H_2O respectively. If a larger quantity of acetic acid is added, the

Bivanadate of Potassium—$K_2O. 2V_2O_5 + 4H_2O$—is obtained in form of small, red, gold-glistening scales. Of ***normal vanadates,*** the author obtained only ***vanadate of manganese*** ($MnV_2O_6 + 4H_2O$) in a pure condition.

In the case of all of the other metals, he obtained either basic compounds, or such that contained potassium. The *acid vanadates* of the heavy metals, on the other hand, were obtained throughout in well characterized crystals, but the salts produced were without exception double salts. These all corresponded, moreover, in their constitution, to the acid vanadate, in which the relation of acid to base is 5:3. Double salts containing more acid could be obtained only in a single case, with potassium and copper = $KCuV_9O_{24} + 17H_2O$. This crystallizes in brown shining crystals.—Arch. d. Pharm., June 1889, 554–555; from Liebig's Annal. d. Chem., 1889, 251, 114.

Fluorides of Vanadium—Preparation and Characters.—Emil Petersen has prepared several fluorides of vanadium by dissolving the oxides in hydrofluoric acid, even the sesquioxide (V_2O_3) being readily dissolved. From the latter he obtained the compound $V_2F_6+6H_2O$, which constituted large, easily soluble, dark-green rhombohedral crystals. He prepared with this compound several double salts. The potassium double salt, which contains 2 mol. of water, was obtained as a sparingly soluble, light-green crystalline powder. The ammonium double salt was obtained in the form of small, grass-green, regular octahedrons. The cobalt double salt was obtained in small, dark-green, monoclinic prisms. From the dioxide of vanadium the author obtained the ammonium double salt in small, blue octahedrons, and the sodium double salt forming a light-blue, sparingly soluble salt. The pentoxide also yielded double salts with potassium and ammonium, the former being colorless, the latter yellow.—Arch. d. Phar., Jan. 1889, 82; from Ber. d. D. Chem. Ges., 21, 3257.

NIOBIUM.

Niobate of Ammonium and Potassium-Fluor-Niobate—New Reagents for Alkaloids, which see under "Organic Chemistry."

MOLYBDENUM.

Molybdic Acid — Volumetric Determination as Lead Salt. — Carl Schindler observes that if solution of ammonium molybdate and of lead acetate are brought in contact, there is found a white precipitate of lead molybdate, which quickly settles if heated. Chatard has already utilized this reaction for the gravimetric determination of molybdic acid. The author applies it for a volumetric determination of both bodies, using an aqueous solution of tannin as indicator. If a drop of this solution is allowed to touch a solution of ammonium molybdate, placed upon a white porcelain plate, there appears, according to the concentration of the molybdate solution, a coloration blood-red to yellowish, distinctly visible at a dilution of 1:400,000, whilst the insoluble lead molybdate gives no color, and lead acetate, if very strong, gives merely a faint greenish-yellow color which cannot be confounded with that just men-

tioned. If we have a solution of ammonium molybdate and precipitate it by the successive addition of solution of lead acetate, a drop of the liquid gives the above reaction as long as molybdic acid remains in solution. Inversely a solution of lead precipitate in a corresponding manner with solution of molybdate does not give this reaction until all the lead is thrown down and molybdic acid is present in slight excess. For the titration the following solutions are required: (1) Solution of lead acetate, prepared as follows: 40 to 50 gms. lead acetate are dissolved in water with the addition of a little acetic acid. The solution is let down to 1 litre and standardized with pure ammonium molybdate, which contains 81.55 per cent. molybdic acid. (2) A solution of ammonium molybdate, of which 1 c. c. = 1 c. c. of the lead solution. 20 gms. of commercial ammonium molybdate are dissolved in 700 to 800 c. c. of water. Ammonia is added until the slight turbidity disappears and the liquid is standardized to Solution 1. (3) Dilute solution of tannic acid in water; about 0.1 gm. to 30 c. c. It should be prepared fresh for every series of experiments. The analysis is executed as follows: The molybdic solution, slightly acidified with acetic acid, is placed in a beaker and boiling water is added until the liquid reaches the volume of 300 to 400 c. c. Lead solution is then dropped in until the molybdic acid is entirely precipitated and a small excess of lead remains in solution. It is stirred and let settle for a moment. Then a large drop is taken from the upper layer of the solution by means of a fine dropping tube, and brought in contact with a drop of the tannin solution upon a porcelain plate. If sufficient lead has been added there appears no color. One-tenth c. c. of the titrated molybdic solution is now added, stirred, let settle, and tested again with the tannin solution. This is repeated until a drop produces a distinct orange color. The volume of the molybdic solution consumed is deducted from that of the lead solution, and the molybdic acid is calculated from the remainder. In determining the lead in a liquid the procedure is analogous. The liquid containing the lead is slightly acidified with acetic acid, and molybdic solution is added until a drop of the liquid gives the molybdic reaction. If the quantity to be determined is not approximately known it should be ascertained by a preliminary experiment. A small excess of lead solution (about 0.5 c. c.) is used, titrating back with molybdic solution. The tannin drops are best placed upon a porcelain plate with depressions.—Chem. News, Aug. 3, 1888, 61; from Zeitschr. f. Analyt. Chem., xxvii, Part 2.

ARSENICUM.

Arsenic—Solubility of its Compounds with Iron.—Experiments made by Schagdenhauffen and Reeb lead them to the following conclusions: The solubility of samples of arseniate of iron—obtained from various sources—is not the same. None of the arsenical compounds with iron

are so insoluble as writers have supposed them; they dissolve in the proportion of 2½ to 1000 in water acidulated with hydrochloric acid, and some samples dissolved in pure water. The hydrated sesquioxide of iron cannot, therefore, be *par excellence*, the antidote for poisoning by arsenic. —Amer. Jour. Phar., Nov. 1888, 563; from Jour. de Phar. d'Als.-Lorr., Sept. 1888.

Arsenic—The Most Suitable Process for the Detection of the Smallest Quantities.—Prof. F. A. Flückiger, as the result of comprehensive experiments, which are given in detail, concludes that for the detection of the smallest quantities of arsenic the method of Gutzeit is far superior to any other as regards accuracy, simplicity, and general utility. The method, as is well known, is based upon the reaction of arsenuretted hydrogen on nitrate of silver, the yellow compound, $AsAg_3(HO_3Ag)_3$ being formed. It is quite possible with this test to recognize the presence of $\frac{1}{1000}$ milligram of As_2O_3 ($=\frac{1}{757}$mg. As). Not quite so sensitive, but not appreciably less so, is the *substitution of mercuric chloride for silver nitrate* in this test, its advantages being that neither light nor water influences the reaction. The generation of the hydrogen for these tests is preferably by the aid of pure zinc and properly diluted hydrochloric or sulphuric acid, rather than by means of sodium amalgam. But the zinc must be carefully tested for its purity; not alone that it must be free from arsenic, but also from all traces of sulphide. Zinc, containing traces of sulphide, eliminates of course sulphuretted hydrogen, and very small quantities of this do not produce black stains upon nitrate of silver or corrosive sublimate paper, but yellow stains similar to those produced by AsH_3. Hence it is necessary to test the zinc carefully, such test being sufficient if the gas produced from 10 grams of the metal with dilute hydrochloric acid, after being allowed to act upon silver nitrate or corrosive sublimate paper, and in the absence of light, produces no sensible change on the respective papers. The author considers it very desirable that absolutely pure zinc, free from sulphur, arsenic, phosphorus and antimony, should be prepared industrially in sticks of not above 5 m.m. in thickness. For the test about 1 gram of zinc—a piece about 4 m.m. long if of the above mentioned thickness—is sufficient. The hydrochloric acid should not have a sp. gr. over 1.036, nor if sulphuric acid above 1.055, otherwise the reaction is too violent. Of these acids, 4 c. c. are sufficient, a narrow-necked flask of 50 c.c. capacity, or a cylinder 10 c.m. in height, being used for the generation of the gas. The orifice in neither case should have a diameter of more than 1½ c.m., and is preliminarily covered with a double layer of filter paper, to guard against spurting; then, the generation of gas being steady and continuous, a drop of saturated and acidulated solution of nitrate of silver is applied to a third piece of filter paper, and when it has uniformly penetrated this paper it is placed over the two previous layers of paper, the whole appa-

ratus being then protected from the light by inverting a small porcelain jar over it. After an hour's exposure to the action of the hydrogen the paper is examined, and if no yellow stain is produced on the outer or inner side of the silver nitrate paper, the absence of arsenic may be concluded. It is necessary to use acidulated solution of nitrate of silver to guard against the reduction of the silver salt by the hydrogen itself. When corrosive sublimate is substituted for silver nitrate, a yellow stain—not as bright however as in the case of silver—changing to brown, is produced. It is not necessary to use a strong corrosive sublimate solution, one of 1:50 answering perfectly.—Arch de Pharm., Jan. 1889, 1–30.

Arsenic—Detection of Minute Traces.—Schlickum states that, if a minute crystal of sodium sulphite is placed in a solution of 0.3 to 0.4 gramme of stannous chloride in pure hydrochloric acid (sp. gr. 1 124), there is liberated not merely sulphurous acid, but sulphuretted hydrogen, the latter owing to the reducing action of the tin-salt upon the sulphurous acid. If a hydrochloric acid solution of white arsenic is cautiously poured over it, there appears, if only $\frac{1}{10}$ milligramme of arsenious acid is present, a yellow ring of arsenic sulphide at the line of junction of the two liquids. This ring gradually increases upwards, and if ½ milligramme is present, it colors the entire upper stratum of acid yellow in the course of a few minutes. With arsenic acid, the reaction requires a little longer. The method succeeds in the presence of bismuth and antimony, as the sulphides of these metals do not form in a strong hydrochloric solution.—Amer. Drugg., Feb. 1889, 30; from Pharm. Zeit.

Arsenic—Action of Sulphuretted Hydrogen.—Le Roy W. McCay observes that if a slow current of sulphuretted hydrogen is passed into the solution of an alkaline arseniate, acidulated with sulphuric or hydrochloric acid, and heated to 70°, there is formed, along with some pentasulphide, a larger or smaller quantity of free sulphoxy-arsenic acid, which, under the influence of the strong mineral acid, is split up into arsenious acid and sulphur. The arsenious acid thus formed is immediately attacked by the sulphuretted hydrogen and thrown down as arsenic trisulphide.—Chem. News, Nov. 23, 1888, 256; from Zeitschr. f. Analyt. Chem., xxvii, Part 5.

Arsenic—Use of Aluminium in Preference to Zinc in Testing.—The following test for arsenic is given in "Farm. Ital.": To the suspected liquid is added, in a test tube, a solution of caustic potash or soda, and then a fragment of aluminium. The mouth of the tube is then closed with paper dipped in a solution of nitrate of silver. If arsenic be present the paper turns black. Aluminium is preferable to zinc, for the latter may contain arsenic, while aluminium is always free from it.—Am. Jour. Phar., Arch. de Pharm., Oct. 5, 1888.

Arsenic.—Presence in *Commercial Glycerin*, which see under "Organic Chemistry."

Arsenic.—Determination in *Golden Sulphuret of Antimony*, which see under "Antimonium."

Arsenic—Separation from Antimony.—O. Koehler describes a method for the separation of small quantities of arsenic from large quantities of antimony, which is based upon the fact that sulphuretted hydrogen does not precipitate antimony from its solution in excess of conc. hydrochloric acid, while the arsenic under the same condition is readily precipitated as sulphide. At least two parts of conc. hydrochloric acid must be used for one part of $SbCl_3$.—Arch. d. Pharm., May 1889, 406–409.

Arsenic, Antimony and Tin—Improved Method of Separation.—E. Lesser prefers the process of F. W. Clarke for the separation and determination of arsenic, antimony and tin, but suggests certain precautions, as follows; The solution of the metals is neutralized, as far as possible, so as to admit of a complete precipitation of the antimony. So much oxalic acid is then added that it may be from 35 to 40 times the weight of the tin. The approximate quantity of tin is found by taking the sulphides thrown down by sulphuretted hydrogen from a distinct portion of the sample, oxidizing with nitric acid, filtering off the insoluble residue of stannic oxide and antimony tetroxide, igniting in a tared crucible, and weighing. After the addition of oxalic acid the solution is heated, and sulphuretted hydrogen passed in to saturation, when the precipitate is filtered off. The metallic sulphides are dissolved in ammonium sulphide and, after acidulation with oxalic acid, again treated, hot, with sulphuretted hydrogen, in order to remove the small quantity of tin which was carried down in the first precipitation. The two filtrates containing the tin are mixed, concentrated, and precipitated according to Clarke's directions with ammonia, ammonium sulphide, and acetic acid, the precipitate being then determined in the ordinary manner as tin oxide. For separating the arsenic and antimony, the sulphides are dissolved off the filter into a beaker in warm ammonium sulphide and then oxidized with hydrochloric acid and potassium chlorate. The solution is mixed with tartaric acid and ammonia in excess, and the arsenic acid is precipitated with magnesia mixture. In order to remove basic magnesium tartrate from the precipitate, it is redissolved in hydrochloric acid, and, with the addition of a little magnesia mixture, once more precipitated with ammonia. The ammonium-magnesium arseniate is then weighed with the ordinary precautions. The filtrate is acidified, and the antimony precipitated with sulphuretted hydrogen; the antimony sulphide is converted into tetroxide and determined as such.—Chem. News, Aug. 24, 1888, 96; from Zeitsch. f. Anal. Chem., xxvii., Part 2.

Arsenious Acid—Compounds with Iodides and with Bromide of Sodium.—F. Rüdorff states that when a solution of 20 grams of As_2O_3 and 120 grams NaBr in 350 c.c. of water is heated to boiling, filtered, and allowed to cool slowly, microscopic six-sided tables of the compound

$NaBr+2As_2O_3$ are deposited on glass plates immersed in the solution. The analogous compound, $NaI+2As_2O_3$, is obtained in the same way from a solution of 22 grams As_2O_3 and 60 grams NaI in 500 c.c. of water. The iodide and bromide of sodium must be in large excess to produce the compounds described. An analogous compound with chloride of sodium could not be obtained.—Arch. d. Pharm., Jan. 1889, 79–80; from Ber. d. D. Chem. Ges., 21, 3051.

ANTIMONIUM.

Antimony—Amorphous Modification.—Amorphous antimony, which has hitherto been noticed during the decomposition of haloidal antimony compounds by the galvanic current, has been obtained by simply heating crystalline antimony at a red heat in a current of nitrogen. It is deposited in form of a gray powder in the colder parts of the apparatus, and contains 99 per cent. of antimony. Its sp. gr. is 0.5 less than that of crystallized antimony, while its melting-point is 174° higher. Since it cannot be produced in a vacuum, nor in an atmosphere of hydrogen, the assumption seems justified that under the conditions of the experiment a compound of antimony and nitrogen is formed, which at the temperature in the cooler parts of the apparatus is again resolved into its elementary components—the antimony in an amorphous condition.—Arch. d. Pharm., Dec. 1888, 1131; from Jour. de Pharm. et de Chim., 1888, xviii., 407.

Antimony—Rapid and Sure Detection.—By adding a drop of ammonium sulphide to the white incrustation of Sb_2O_3 obtained by heating the antimoniferous mineral with fusion mixture in the inner blowpipe flame, Alexander Johnstone has shown how antimony can be rapidly and surely detected. When the antimony is present in *very* small quantity, the charcoal method must be the one adopted. In other cases, however, when the metal is more abundant, it can be quickly and very satisfactorily identified by heating the substance, with the addition of fusion mixture, in a glass tube (having about ¼″ bore) *open at both ends.* A little of the mixture of pounded mineral and flux is placed in the glass tube at a distance of about a quarter of an inch from the end. The tube is inclined slightly, and heat by means of a blowpipe flame is applied. Dense white smoke is produced, and a white sublimate deposits on the upper and sometimes also on the lower side of the tube. Touch this white sublimate with a *single* drop of ammonium sulphide, and at once the highly characteristic orange sulphide of antimony is produced very distinctly. No other white sublimate obtained in the open tube in the manner described than Sb_2O_3 is converted into an orange-colored substance on the application of ammonium sulphide.—Chem. News, Jan. 11, 1889, 15.

Golden Sulphuret of Antimony—Insufficiency of the Test of the German Pharmacopœia for the Presence of Arsenic.—The German Pharm. test

for determining the presence of arsenic in golden sulphuret of antimony, consists in dissolving the compound in ammonia, reprecipitating it by hydrochloric acid, washing the precipitate thoroughly, and then shaking it with solution of carbonate of ammonium and filtering immediately. The filtrate, acidulated with hydrochloric acid, should not produce a yellow color with sulphuretted hydrogen water. Brenstein, however, calls attention to the fact that the filtrate, even perfectly pure golden sulphuret, known to be free from arsenic, will produce a yellow color under this treatment, owing to the presence in it of minute quantities of antimony. The filtrate should, therefore, be allowed to stand several hours (after the addition of sulphuretted hydrogen water ? Rep.), after which it is passed through a small filter; the residue in the filter is oxidized with chlorate of potassium and hydrochloric acid, and any arsenic contained in it is precipitated in the well-known manner as ammonium magnesium arseniate. After twenty-four hours the clear liquid is decanted from the precipitate as far as possible, the residue is well stirred, and a portion of it examined under the microscope, when the peculiar six-sided prisms, resembling a coffin-lid, of ammonium-magnesium arseniate, are easily recognized. The corresponding phosphoric acid compound, though not to be expected, is excluded by treating the substance on the slide with a drop of dilute nitric acid and about 6 drops of solution of nitrate of silver, when, upon careful neutralization, a distinct red-brown turbidity of arseniate of silver is produced.—Arch. d. Pharm., Feb. 1889, 126; from Pharm. Ztg., 33, 751.

BISMUTHUM.

Bismuth—Characteristic Reaction.—The characteristic reaction of bismuth in potassium iodide with alkaloids may according to E. Léger be made available inversely for the detection of bismuth. The author used a reagent composed of cinchonine, 1 gm.; iodide of potassium, 2 gm.; distilled water, 100 gm. The cinchonine is dissolved in water with the aid of a few drops of nitric acid; the liquid is heated and the iodide added. This solution, added to one of nitrate of bismuth, gives an orange-yellow precipitate. It should be used in excess, avoiding solutions containing hydrochloric or sulphuric acid; it must not contain too much nitric acid. This reagent may be used for metals precipitable by H_2S, whose sulphides are insoluble in sulphydrate of ammonium. It gives with minimum solutions of mercury greenish-yellow precipitate, turning black with excess; maximum solutions give yellowish-white; cadmium, white or yellowish; silver, the iodide if the argentic salt is in excess, yellow if the reagent is in excess; copper, minimum, precipitate of cupric iodide; maximum, brown maroon, containing iodine, copper and cinchonine; lead, sulphur-yellow precipitate, soluble in an excess of nitrate of lead, and containing iodine, lead and cinchonine.—J. de Phar. et de Chim., Dec. 15, 1888.

Oxy-Salts of Bismuth—Composition, etc.—Mr. Frank X. Moerk communicates the results of the examination of commercial samples of subnitrate and subcarbonate of bismuth, and, incidentally, gives a process for preparing pure oxyiodide. In the case of

Subnitrate of Bismuth, there is a decided deficiency of water, the amount present being generally less than half that required by the generally accepted formula, viz.: $BiONO_3.H_2O$. Calculating the amount of subnitrate from the N_2O_5 found, the results were as follows:

	$BiONO_3$	Bi_2O_3	H_2O
$BiONO_3.H_2O$	94.12		5.88
No. 1.	85.23	11.71	2.95
No. 2.	86.40	10.50	3.02
No. 3.	85.55	10.84	3.62
No. 4.	84.11	13.51	2.35

The anhydrous compound, produced by heating at 140° C. for 1½ hours, during which no nitric acid or nitric oxide was volatilized, is very hygroscopic, regaining during 12 hours' exposure almost the entire amount present in the sample before heating. The author's experiments, furthermore, seem to point out that in order to secure a product of uniform composition the acid solution of bismuth nitrate should be poured into such a quantity of water that the filtrate resulting from the precipitated subnitrate shall contain 0.15 per cent. of HNO_3. The precipitate, also, should not be washed, but the excess of liquid absorbed by some porous material after thorough draining. Respecting

Subcarbonate of Bismuth, the anthor finds that here also the amount of water present in the samples is insufficient to represent a molecule, and that the product contains some nitric acid as subnitrate, as well as more or less oxide. The following represents his analytical results:

	$(BiO)_2CO_3$	H_2O	$BiONO_3$	Bi_2O_3
$(BiO)_2CO_3H_2O$	96.60	3.40		
No. 1.	91.93	1.00	6.35	0.71
No. 2.	87.50	0.40	1.17	10 75
No. 3.	94.84	0.20	4.91	

In consideration of his results and the fact that the commercial product contains such a small percentage of water, the recommendation is thought well-based to make the subcarbonate by using a boiling solution of sodium carbonate and adding thereto the bismuth nitrate solution, with the additional precaution of boiling vigorously for several minutes after the addition of the latter solution. Although yielding an anhydrous product, it will be free from more than traces of nitrate.

Oxyiodide of Bismuth.—In connection with the above experiments the author draws attention to the observation that the difficulties encoun-

tered by most writers on the subject of oxyiodide of bismuth, are to be traced to the presence of oxide in the subnitrate used, the former not being acted on by the KI. He overcomes this obstacle in the following process, in which sufficient nitric acid is used to convert the oxide present, to the extent of 18 per cent., into true subnitrate.

Bismuth subnitrate	20 gm.
HNO_3 (sp. gr. 1.42)	1 c.c.
Water	300 c.c.
KI	12 gm.

Boil the subnitrate with the nitric acid and 200 c.c. water for 10 minutes, then add the potassium iodide dissolved in 100 c.c. water, boil for half hour, filter and wash thoroughly until washings cease to give more than turbidity with silver nitrate. Dry at a temperature not above 100° C. This furnishes a pure salt, and although in an extremely fine crystalline powder, shows its crystalline characteristic by a glistening film on the interior of the bottle in which it is kept.—Amer. Jour. Phar., August 1888, 385–388.

Subnitrate of Bismuth—U. S. P. Formula.—Supplementary to his above observations on oxy-salts of bismuth, F. X. Moerk records some experiments respecting the influence of the ammonia used in the U. S. P. (1870) process in increasing the basicity of the product. His results show that even in the presence of several per cent. of ammonium nitrate, ammonium hydrate readily unites with the acid of the freshly precipitated salt, giving a very basic product; that $BiONO_3$ can only be obtained from decidedly acid solutions; that the product must be very sparingly washed (best by displacement in a percolator); that dilute NH_4NO_3 solution containing less than 0.5 per cent. will remove acid from $BiONO_3$ (result of experiments with); and, lastly, that the U. S. P. (1870) formula, containing a little over one per cent. free HNO_3, will give a good product, losing however a portion of the water whilst drying.—Amer. Jour. Phar., Sept. 1888, 445–447.

Bismuthyl-iodide (Bismuth-subiodide or Oxyiodide)—Preparation and Estimation—Charles E. Greene reviews the different processes for the preparation of subiodide of bismuth that have been suggested during the past few years, (see the recent volumes of "Proceedings,") and has found the method of "precipitation" to be the best, though far from perfect. He finds that it should be modified as follows: Dissolve 409 grs. $BiONO_3H_2O$ in 1 fl. oz. HNO_3 with the aid of heat, as is stated in Mr. England's formula; then carefully dilute this solution with water as long as $BiONO_3$ is not reprecipitated, or, at least, until it has assumed a slight permanent opalescence. Add to this 221 grs. of KI, dissolved in about 16 fluid-ounces of *cold* water, in a large flask or some suitable vessel, agitate thoroughly, and *then* apply heat, *but not to the boiling-point,*

(about 80°–85° C.). The mixture at first assumes a black color, growing gradually brownish, becoming still lighter as it is agitated, and under the influence of *moderate* heat and violent agitation it is finally changed from a light brown to a brilliant red. The agitation is continued for a few moments longer, that the reaction may be completed. The precipitate is washed by decantation, drained upon a plain filter, and dried at 100° C. The yield should be about 470 grs. The whole operation is completed in a very short while. No iodine is liberated, and hence the product contains a larger and proper percentage of it, and represents a pure article of BiOI.

Bismuthyl iodide so obtained is of a very bright red color, almost vermilion, and has the additional advantage of being in very fine powder, light and bulky, admirably adapted for use as a dusting powder or dressing, an advantage possessed by none of the other specimens. By analysis he found it to contain 35.8 per cent. of iodine, making 99.44 per cent. BiOI, with only 0.35 per cent. $BiONO_3H_2O$.

The mode of analysis which was pursued in the author's experiments, is as follows:

For Estimation of Iodine.—Place 0.5 gm. BiOI in a flask with a few pieces of test zinc, cover with water, and mix thoroughly, then add sufficient H_2So_4 to evolve hydrogen slowly, at the same time decomposing the BiOI. Thus H combines with I to form hydriodic acid, while $ZnSo_4$ is formed and Bi is precipitated in black flocculent masses. This reaction is completed in two or three hours. Neutralize the resulting mixture carefully with KHO, add a few drops of solution K_2CrO_4 as an indicator; titrate with $\frac{1}{10}$ normal solution of $AgNO_3$ until a red precipitate begins to form. The percentage of iodine is then calculated as by U. S. P. process.

For Estimation of Bismuth.—Dissolve 0.5 gm. BiOI in a small quantity of nitric acid, dilute with water, boil until all iodine has been vaporized and all odor of HNO_3 has disappeared; add to this KHO, until a precipitate is formed which does not redissolve on shaking. Collect on a plain filter, wash well, ignite and weigh as Bi_2O_3.

Amer. Jour. Pharm., April 1889, 161–165.—F. X. Moerk communicates some critical remarks on the above.—Ibid, May 1889, 236–237.

HYDRARGYRUM.

Mercury—Purification.—J. M. Crafts effects the purification of mercury by passing air through the mercury for forty-eight hours. The impurities, zinc, lead, tin, etc., collect at the top of the tube in the form of a black powder. The removal of traces of silver and gold is not necessary for mercury intended for filling barometers and similar instruments. These impurities do not affect the density of the mercury, nor alter the appearance of the meniscus. The author considers that if pure air has

any oxidizing action upon pure mercury, it is so slight as to be scarcely appreciable. Platinum in thin foil is not attacked by mercury in the cold, but on prolonged boiling the platinum is attacked, the greater part remaining in suspension as a black powder.—Chem. News, Aug. 3, 1888, 60; from Bull. Soc. Chim., 1888, No. 9.

Mercury—Determination as Oxydimercuriammonium-iodide.—Professor Joseph Klein proposes as a sensitive test for mercury a reaction which is the reverse of the well-known Nessler's test for ammonia. To the dilute aqueous or acidulated solution suspected to contain a salt of mercury a little iodide of potassium is added, followed by solution of soda and then chloride of ammonium, the quantities of these reagents varying with the amount of mercury supposed to be in the solution. A large excess of iodide of potassium must be avoided, since concentrated solutions of iodide of potassium exert solvent action on the oxydimercuriammonium-iodide. When working with more concentrated solutions the chloride ammonium solution is added direct; in case of very dilute solutions a layer of solution is superimposed over the liquid to be tested. In the first case a turbidity is produced throughout the liquid, in the second merely a turbid zone if mercury is present. The author's experiments, furthermore, prove that the presence of organic matter does not interfere with the reaction, and he considers it quite feasible to determine the presence of mercury in urine direct, it being necessary simply to oxidize the organic substances in it as far as possible with hydrochloric acid and chlorate of potassium.—Arch. d. Phar., Jan. 1889, 73–77.

Mercurous Oxide—Presence of Metal and Mercuric Oxide.—Recent investigations of W. Bruns and O. v. d. Pfordten seem to show that it is impossible to produce mercurous oxide that is free from metallic mercury and mercuric oxide. The most sensitive test is doubtless that with metallic gold, which showed the presence of metallic mercury in the freshly prepared moist article, even when the precipitation was conducted in the dark. The authors further found that dry mercurous oxide gains weight on exposure to air, becoming oxidized. Mercurous oxide, therefore, not only decomposes into metal and the higher oxide, but the latter also is produced by the absorption of oxygen from the air.—Arch. d. Pharm., Aug. 1888, 744–745; from Ber. d. D. Chem. Ges., 21, 2010.

Mercuric Oxide—Presence of Metallic Mercury.—H. C. Vielhaber calls attention to the observation which he has made in the course of his official examination of the stock in German drug stores, that the mercuric oxide that had been made in the private laboratories of the apothecaries was almost uniformly of unexceptional quality, whilst the purchased articles—made on a large scale, and by some of the most renowned manufacturers—almost invariably contained metallic mercury, and frequently also undecomposed nitrate. The cause of this must be sought in

the difficulty to control the heat on a large scale so as to prevent overheating and consequent decomposition of the oxide, whilst on a small scale this overheating is readily avoided.—Arch. d. Phamr., Feb. 1889, 121–124.

Calomel—Effect of Sodium Chloride.—John L. Morison has studied the effect of sodium chloride upon mercurous chloride in the following manner: Three beakers were placed in a water-bath for five or six hours at a temperature of 40° C.; each beaker contained a mixture of 2 gm. calomel, 6 gm. sodium chloride and 30 c.c. distilled water; to one was added 2 c.c. hydrochloric acid, and to another a solution of pepsin acidulated with hydrochloric acid. The light was carefully excluded. On testing the liquids no mercuric chloride was found; but the acidulated pepsin solution contained a small amount of calomel (?), which caused a deposit of mercury upon bright copper foil, and this, on being heated in a tube, yielded a sublimate of metallic mercury which, with a fragment of iodine, formed the red iodide.

A mixture of calomel and sodium chloride suspended in milk was next introduced, by means of a rubber tube, directly into the stomach of a dog. After one hour the dog was killed with chloroform; the stomach with contents was digested with ether, the ethereal solution distilled, the residue freed from fat by petroleum benzin, and then exhausted with boiling distilled water; this solution was free from mercury.—Amer. Jour. Pharm., March 1889, 123.

Corrosive Sublimate—Volumetric Determination in Bandages.—Dr. G. Kassner recommends the following method for the volumetric determination of corrosive sublimate in bandages and the like: 50 grams of the bandage, which need not be torn or cut up, are placed in a dry strong porcelain capsule, covered with 500 c.c. cold water, and thoroughly kneaded with a broad and flat pestle, carefully avoiding the loss of liquid during this operation. A solution of 0.4 tartar emetic and 1 gram of phosphate of sodium (or 1–2 grams of acetate of sodium) in sufficient water to make exactly 500 c.c. is then added, and the kneading is continued with proper precautions. During this treatment the corrosive sublimate is reduced to calomel, which separates as a white powder, and an aliquot part of the oxide of antimony in the tartar emetic is converted into antimonic acid. The mixture is filtered, and 500 c.c. of the filtrate are titrated with $\frac{1}{10}$ N. iodine solution after the addition of some fresh starch paste and a sufficient quantity of bicarbonate of sodium. From the quantity of iodine solution required, the quantity of unconsumed tartar emetic (resp. Sb_2O_3) is calculated, and from the consumed tartar emetic the quantity of corrosive sublimate in the sample. The reaction is shown by the following equation:

$$4HgCl_2+Sb_2O_3+2H_2O=4HCl+Sb_2O_5+4HgCl.$$

The method possesses the advantage of accuracy, combined with the avoidance of extracting the corrosive sublimate from the fabric, which experience has shown, is very difficult. The author communicates experimental data which substantiate the accuracy of the method.—Arch. d. Pharm., July 595–604.

Corrosive Sublimate — Permanent Solution.—Professor Krœnlein recommends the following solution of mercuric chloride as being permanent: Mercuric chloride, 10; sodium chloride, 10; acetic acid, 5; and water, 75 parts. This 10 per cent. solution is intended to be kept on hand for the rapid and convenient preparation of the weak antiseptic solutions containing $\frac{1}{20}$, $\frac{1}{10}$, etc., per cent. of mercuric chloride.—Amer. Jour. Pharm., Aug. 1888, 407; from Corr. Bl. f. Schw. Ærtzte.

Corrosive Sublimate — Solubility in Solutions of Chloride of Sodium.— Dr. Homeyer and E. Ritsert have determined the solubility of corrosive sublimate in solutions of chloride of sodium of different strengths as follows:

Percentage of Na Cl solution.	100 parts Na Cl solution dissolve at 15°	at 65°	at 100°
26 per cent. (saturated).	128 gm. $HgCl_2$	152 gm. $HgCl_2$	208 gm. $HgCl_2$
25 "	120 " "	142 " "	196 " "
10 "	58 " "	68 " "	110 " "
5 "	30 " "	36 " "	64 " "
1 "	14 " "	18 " "	48 " "
0.5 "	10 " "	13 " "	44 " "

For hospital use, instead of a concentrated alcoholic solution, they recommend: Corrosive sublimate, 50; sodium chloride, 5; distilled water, 45.—Pharm. Ztg., 1888, 739.

Corrosive Sublimate—Action of Tartaric Acid.—One of the main objections to the use of solutions of corrosive sublimate as an antiseptic in surgery is its power to coagulate albumen. Among the substances which prevent or diminish the coagulating effect of the mercuric chloride, tartaric acid holds a prominent place; but, Mr. D. B. Dott observes, there is an objection to its use for this purpose, which has hitherto not been pointed out. He finds that if tartaric acid is added to a dilute solution of mercuric chloride—such as is used for antiseptic purposes—a white precipitate slowly makes its appearance, and increases in amount as the solution is allowed to stand. This precipitate is calomel. While this change takes place slowly, and fresh solutions containing tartaric acid can even be boiled without immediate change, there is evidently a risk of the solution being weakened if it be kept for any length of time.—Pharm. Jour. and Trans., April 20, 1889, 841.

Corrosive Sublimate—Necessity of Acid Solution for Surgical Dressings. —Dr. Laplace states that ordinary solutions of corrosive sublimate are in-

efficacious for fabrics used in surgical dressings, on account of the tendency to form mercuric albuminate; this is prevented by acidulating the solution. He also says that the antiseptic power of sublimate solutions is increased by such additions, so that weaker mixtures may be used with equally good effect. He thinks that where acids are thus used there is no need of iodoform. For lotions he recommends: Corrosive sublimate, 1 gm.; tartaric acid, 5 gm.; distilled water, 1000 gm. A solution in which to immerse gauze, bandages, etc., is composed of: sublimate, 5 gm.; tartaric acid, 20 gm.; distilled water, 1000 gm.—Amer. Jour. Pharm., Aug. 1888, 404; from Nouv. Rem., May 24, 1888.

Corrosive Sublimate—Use in Place of Nitrate of Silver in Testing for Arsenic by Gutzeit's Method, which see under "Arsenic,"

Ammonium-mercuric Chloride—Methods of Production.—G. André observes that the action of dilute ammonia upon a solution of mercuric chloride gives rise either to mercury chloramidide or dimercuriammonium chloride, or to a mixture of both compounds. The reaction is different if, along with the mercuric chloride, there is added an equivalent quantity of potash, thus forming yellow mercuric oxide, upon which a solution of ammonium chloride is then poured, or if a portion only of the mercuric chloride is decomposed by potash, and ammonia is poured upon the mixture of chloride and oxide. In these cases there is produced, in part at least, tetra-mercuriammonium chloride.—Chem. News, Jan. 21, 1889, 301; from Compt. rend., May 27, 1889.

Ammonium-Mercuric Chloride—Prevention of Precipitate in Presence of Ammonium Carbonate.—G. Stillingfleet Johnson has observed that ammonium carbonate is far more powerful in preventing the precipitation of mercuric chloride from solution of ammonia than is ammonium chloride. He finds that the addition of ammonium carbonate or its formation in water of ammonia not alone causes resolution of the white precipitate as fast as it is formed, when mercuric chloride is added little by little, but that, after complete precipitation of a solution of mercuric chloride by ammonia water, the addition of ammonium carbonate causes the precipitate to redissolve. The author's observation points out the necessity to insure the absence of ammonium carbonate in the ammonia water used for the preparation of white precipitate.—Chem. News, May 17, 1889, 234.

Iodides of Mercury—Preparation.—Robert L. Eads recommends for the preparation of

Red Iodide of Mercury, to use the mercuric chloride and potassium iodide in exact molecular proportion, whereby loss is avoided. The color of the green iodide seems to be affected, aside from exposure to light, by the temperature resulting from the combination of the two ele-

ments, a darker color with a brown tint being produced on effecting the combination rapidly with the development of heat.

On heating solutions of mercuric nitrate with excess of iodine, bright red scales are obtained after cooling. A concentrated solution of mercurous nitrate heated with excess of iodine, acicular crystals of a yellowish color with a pink tint were obtained; dissolved in alcohol and the solution evaporated spontaneously, scarlet crystals resulted.

Yellow Iodide of Mercury, in crystals, was obtained by the process recommended by Stroman (Berichte, 1887, p. 2818) by boiling mercurous nitrate with excess of iodine. On washing the crystals with water, they are converted into a red powder.—Amer. Jour. Pharm., March 1889, 123.

ARGENTUM.

Silver—Use in Ash Determination.—G. Kassne recommends the addition of an equal weight of finely divided metallic silver to such organic substances as are difficultly incinerated. The use is based upon silver absorbing oxygen at higher temperatures, which is then readily yielded to the carbonaceous matter. F. Stolba has obtained complete incineration, in ½ to ¾ hours, of substances which, without this addition, required six hours. Ferric oxide can be used in the same way, but the ash is not so easily examined. Platinic chloride and spongy platinum have been used with the same result as with metallic silver.—Pharm. Ztg., 1888, 766–781.

Nickel Silver—Method of Analysis.—Dr. Felix Oertel suggests the following method for the analysis of "nickel silver:" The solution obtained by dissolving the metal in nitric acid, and thus, if needful, freed from tin, is evaporated with sulphuric acid (using to ½ gm. metal 15 or 20 drops of the mono-hydrated acid), and thus separating out the lead as sulphate. To the liquid thus freed from lead and tin, and amounting to about 100 c.c., there are added 2 c.c. of strong hydrochloric acid, and sulphuretted hydrogen is passed in. When the precipitation is complete, which is known by the rapid subsidence of the copper sulphide, it is heated for a few minutes to a boil, cooled again, a few bubbles of sulphuretted hydrogen are passed in (which occasion no turbidity if the precipitation was complete), and filtered. The copper sulphide thus obtained, which is rather dense and does not readily oxidize in the air, is washed on the filter, first with very dilute hydrochloric acid containing sulphuretted hydrogen, and then with water (to which a little sulphuretted hydrogen-water has been added) until the acid reaction disappears. When dry it is weighed as a sulphide in a Rose crucible. It is necessary to add a little sulphur before heating only if the quantity is very trifling. As soon as the odor of sulphurous acid has disappeared it is still ignited for three minutes in a slow current of hydrogen, and is then allowed to cool in the same current. When thus obtained the copper sulphide has at once the correct weight. When

the copper has been removed, the zinc is separated according to the method of Smith and Brunner, by passing sulphuretted hydrogen into a perfectly neutral solution. After some time a few drops of sodium acetate should be added, to neutralize the acid liberated and prevent imperfect precipitation. The author, however, prefers to add the sodium acetate at once after neutralizing and before introducing the sulphuretted hydrogen. White pulverulent zinc sulphide is then deposited, which, after standing for a few hours, may be filtered and washed with sulphuretted hydrogen water without running through the filter turbid. The precipitate, when dry, is ignited in a Rose crucible in a current of hydrogen, and weighed as zinc sulphide. The solution still contains nickel, cobalt, iron, and generally a little manganese. The filtrate is boiled to expel sulphuretted hydrogen, oxidized with bromine water, the iron precipitated with ammonia as a basic salt, purified by reprecipitation, the mixed filtrates are rendered strongly ammoniacal and submitted to electrolysis. Nickel and cobalt separate upon the platinum cone as a firmly adhesive layer. When the precipitation is complete the cone is lifted out, rinsed with the washing bottle, plunged in ordinary alcohol, and dried over a small gas-flame. Any manganese present is separated out during the electrolysis in brown flakes; it is filtered off and weighed as mangano-manganic oxide.—Chem. News, July 27, 1888, 48; from Zeitschr. f. Anal. Chem., xxvii, part I.

Silver Iodide—Use in the Nascent State.—Dr. Grasselli directs attention to the successful use of *nascent* silver iodide in certain forms of conjunctivitis. He employs for this purpose two solutions, one containing 3.56 gm. of silver nitrate, and the other 3.52 gm. of potassium iodide. The salts are dissolved separately each in 3.5 gm. of water and 6.5 gm. of glycerin, and the silver solution is kept in a blue or amber-colored vial. For use two drops of the silver solution are mixed in a watch glass with three drops of the iodide solution, and this mixture is at once applied by means of a camel's hair pencil.—Amer. Jour. Pharm., Aug. 1888, 407; from Recueil d'Ophthal.

Silver Nitrate—Use as a Test for Cotton Seed Oil.—See *Fixed Oils*, under "Organic Chemistry."

AURUM.

Gold—Atomic Weight.—Prof. J. W. Mallet, after noticing and giving the results of the earlier determinations of the atomic weight of gold, and the recent researches of Krüss and of Thorpe and Laurie, describes the experiments made by himself in the same direction, which have occupied much of his time and labor during the past three or four years. He gives a detailed account of the methods adopted in seven series of experiments, looking to more or less independent determinations of the atomic weight sought. The results obtained are stated as follows:

	Atomic Weight of Gold.		
	Average value from aggregate weights.	Lowest value from a single experiment.	Highest value from a single experiment.
1st series (5 experiments)	196.722	196.688	196.770
2d " (6 ")	196.790	196.731	196.843
3d " (4 ")	196.775	196.685	196.817
4th " (5 ")	19ˉ.225	197.131	197.289
5th " (5 ")	196.823	196.709	196.945
6th " (3 ")	197.137	196.994	197.283
7th " (6 ")	196 897	196.848	196.956

But reasons are given for feeling much less confidence in the results of the fifth and sixth series of experiments (made by electrolysis) than in the rest; if these two series be excluded the general mean becomes 196.882.

A certain degree of suspicion as to possible constant error having been shown to perhaps affect the results of the fourth series, if this also be left out, and only the first three and the seventh series be considered, the general mean will be 196.796.

And finally, if, for the sake of comparison with the results of the recent researches of other chemists, only the first three series be included, in which auric chloride and bromide were examined, the general mean will be 196.762—a result higher than that of Krüss and lower than that of Thorpe and Laurie, but nearer to the latter than the former.

If the general mean be taken of the results of all these series of experiments, using the average value derived from each, and giving all an equal weight, the number 196.910 is obtained for the atomic weight of gold.—Chem. News, May 24, 1889, 243; from paper communicated to "Royal Society," May 9, 1889.

Gold—Limits of Error in Assay.—Paul Carpentier states that the assay of fine gold, founded, on the one hand, upon the cupellation of this metal in presence of silver and lead, and on the other hand upon the treatment of the alloy with nitric acid, is capable of a very high degree of accuracy. In general the determination of gold by this method can be guaranteed to about $\frac{3}{10000}$. But this result can be reached only by adhering closely to certain experimental necessities which long practice has taught. The author has sought to determine what is the maximum error which may ensue if any one of these rules is neglected, whilst the others are adhered to. If the heat of the muffle is too high, there may be a mean loss of gold of $\frac{24}{10000}$, and if too low an excess of $\frac{6}{10000}$. If the maximum quantity of lead has been used, the mean loss is $\frac{2}{10000}$, and if it is too far reduced, the mean excess may be $\frac{6}{10000}$. Both an excess and a deficiency of silver show an excess of gold, in the latter case to 100 per

cent.—Chem. News, April 12, 1889, 179; from Compt. Rend., March 18, 1889.

Gold—Assay by the Aid of Bromine instead of Chlorine.—W. H. Burfield suggests the use of bromine as more convenient in every respect than chlorine for the assay of gold ores, and gives the following directions: Weigh out the material, more or less according to richness, roast, with or without salt if sulphides are present, put it into any kind of a bottle which will hold about one-third more than the quantity to be treated (a one-half gallon acid bottle will answer well for three or four pounds material), then add bromine water of any strength so that it will stand an inch or two over the ore, cork the bottle and shake well for a short time, let stand about an hour, giving it an occasional shake. If the gold is not too coarse and there is by this time still free bromine in the bottle, the solution is complete; otherwise more bromine water must be added and additional time given. Pour the contents of the bottle into a filter, wash thoroughly with cold water until the wash-water is not any more darkened by a solution of ferrous sulphate, best seen in a porcelain evaporating dish. Treat the filtrate in the same manner as if chlorine gas had been used.—Chem. News, Aug. 24, 1888, 92; from Eng. and Min. Jour.

Gold—Quantitative Determination, and Separation from the Platinum Metals.—It is remarked in the work of R. Fresenius on "Quantitative Analysis," 6th edit., vol. i, p. 623, that gold can be separated from all the oxides of the groups I. to V. by means of oxalic acid, with the exception of lead oxide, mercurous oxide, and silver oxide in hydrochloric solution. Hoffmann and Krüss remark that soluble mercurous salts cannot exist in presence of auric chloride, as they become converted into mercuric compounds, and reduce the gold to aurous oxide. If, therefore, gold and mercury exist simultaneously in a solution, both must be in the higher state of oxidation, and in this case oxalic acid is the only good agent for their separation.—Chem. News, July 27, 1888, 49; from Zeitsch. f. Anal. Chem., xxvii, part I.

Auric Chloride—Formation by the Action of Chlorine.—G. Krüss and F. W. Schmidt have determined that by the action of gaseous chlorine upon dry, pulverized gold, auric chloride ($AuCl_3$) and auro-auric chloride (Au_2Cl_4), as observed by J. Thomsen, is produced. Bromine exhibits a perfectly analogous relation to the gold, auric bromide ($AuBr_3$) and not auro-auric bromide (Au_2Br_4) being produced. Bromine combines with the gold with great avidity, considerable heat being produced during the violent reaction.—Arch. d. Pharm., Oct. 1888, 945; from Jour. f. prakt. Chem., 38, 77.

Auric Chloride—Proposed Use for the Detection of Cotton-Seed Oil in other Fixed Oils, which see under "Organic Chemistry."

Bromide of Gold—Value in Therapeutics.—Dr. Goubert describes his successful treatment by bromide of gold of epilepsy and the various forms of migraine. He says that bromide of gold is better tolerated than are the other bromides, though too high doses determine "a not severe cephalalgia without somnolence." The dose for adults is 8 mgm., gradually increased to 12 mgm.; for children, 3 to 6 mgm. The author administered the salt in weak solution. He states that "the action of this medicament is durable, and epileptics who have taken it sometimes remain for several years free from the attacks."—Amer. Jour. Pharm., June 1889, 290; from Répert. de Phar., April 10, 1889.

PLATINUM.

Platinum—Occurrence in Canada.—Platinum has been found in the nickeliferous ore of Sudbury, Canada, by Professor F. W. Clarke. This discovery was made accidentally in the course of determinative and analytical work upon the ore, which presents other peculiarities. While the amount found is of little or no commercial importance, it has a very great scientific significance, and is certainly something new. Platinum grains have been found in secondary rocks, such as recent sandstones, conglomerates, etc., but never before, so far as we are aware, in vein stuff, although it has long been looked for, and such an occurrence was to be expected. There is, therefore, always the chance that mines of platinum-bearing material, so often falsely reported, may actually be found, and that perhaps some of them may be of a paying grade. The number of localities and their wide distribution in this country point to such an outcome.—Amer. Drugg., June 1889, 109.

PALLADIUM.

Palladium—Redetermination of Atomic Weight.—Dr. E. H. Keiser states that the atomic weight of palladium has not been determined very carefully. The only data for the calculation of this constant, at the present time, are two analyses of the double chloride of palladium and potassium, made by Berzelius in 1828. These two analyses do not agree very well. The first one gives 105.7 and the second one 106.2 for the atomic weight of palladium. The author describes the methods employed by him for redetermining the atomic weight of this metal, and gives the results as follows:

Determination of Atomic Weight of Palladium — 1. By ignition of $PdN_2H_6Cl_2$ in current of hydrogen.

No.	Weight of Substance.	Weight of Palladium.	Atomic Weight.
1	0.83260	0.41965	106.459
2	1.72635	0.86992	106 410
3	1.40280	0.70670	106.355
4	1.57940	0.79562	106.342
5	1.89895	0.95650	106.321
6	1.48065	0.74570	106.292
7	1.56015	0.78585	106.322
8	1.82658	0.92003	106.317
9	2.40125	1.20970	106.355
10	1.10400	0.55629	106.400
11	0.93310	0.47010	106.366
Total	16.74583	8.43606	[106.3520]

Atomic weight=106.35 H= 1. Maximum=106.459
N=14.01 Minimum 106.292

Cl=35.37 Difference= .167

Atomic weight=106.62, when O=16.

The foregoing table contains the results of all the determinations that were made. The investigation will be continued. It is intended to make a series of determinations by means of other palladium compounds. —Chem. News, May 31, 1889, 262–263; from Jour. Franklin Inst., April 1889.

RHODIUM.

Rhodium—Researches Respecting its Position among Metallic Elements. —E. Leidie, after reviewing former processes for preparing sesquichloride of rhodium, describes his method for preparing the anhydrous sesquichloride and the corresponding hydrate, the double chlorides of rhodium and potassium, rhodium and sodium, and rhodium and ammonium. He then describes rhodium sesquioxide, sesquisulphide; the neutral and basic rhodium sulphates and the double oxalates. The author considers that although rhodium is distinguished from such metals as aluminium, iron, and chromium, by its inability—as far as we can judge at present—of forming alums, it approaches them, nevertheless, by certain common characters, such as the formation of a sesquichloride and double chlorides, a sesquioxide with a series of salts, a sesquisulphide and double sulphides, a regular series of double oxalates, and lastly a chloramidide and its derivatives which approximate it, especially to chrome. We may therefore consider it as the analogue of chrome among those metals known as the platinum group.—Chem. News, Jan. 18, 1889, 37; from Bull. Soc. Chim., Dec. 20, 1888.

New Metals.—According to "Chemiker Zeitung," K. D. Chrustschoff has demonstrated the existence of a new metal, to which he has given the name—

Russium.—This metal approximates closely to thorium, and is one of the bodies whose existence was foreseen by Prof. Mendeleef.

Gnomium is the name which Krüss has given to the metal which he has detected along with nickel and cobalt (which see).—Chem. News, May 17, 1889, 234.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(*Including Volatile Oils.*)

Hydrocarbons—Oxidation.—George Wagner has found that by the oxidation of *olefines* (the hydrocarbons of the amylen series of the formula C_nH_{2n}), they are hydroxylated direct, two hydroxyl atoms uniting with each pair of carbon-atoms, and producing polyatomic alcohols. The same is the case with the diallyl class of hydrocarbons. The other hydrocarbons of the series C_nH_{2n-2} appear in the first place to take up two hydroxyls and one molecule of water, and thus to form products that are afterwards further changed.—Arch. d. Phar., Feb. 1889, 179; from Ber. d. D. Chem. Ges., 21, 3343.

Solid Hydrocarbons—Occurrence in Plants.—Helen C. DeS. Abbott and Henry Trimble have made the interesting observation that when certain plants are exhausted with petroleum-ether, crystalline compounds may be separated from the extracts which have not been noticed previously to these investigations. These compounds are also obtained when alcohol or ether is used as a solvent; but it is preferable, on account of the greater number of constituents extracted by these menstrua, to employ petroleum-ether, and thus avoid certain difficulties of separation. Among the plants in which up to this time these compounds have been discovered may be mentioned: *Cascara amarga*, *Phlox Carolina* and the *Phlox* species, *Anthemis nobilis*, and in different species of the following natural orders: Rubiaceæ, Rhodoraceæ, Eupatorieæ and other Compositæ. The crystals from these petroleum-ether extracts first attracted attention in the winter of 1884. Samples of "chichipate" bark which yielded on powdering about two hundred grammes, were then obtained and submitted to chemical examination. This bark was subsequently, from chemical analysis, identified as *Cascara amarga*. Recently the

authors have renewed their studies upon 25 kilos of *Cascara amarga* and 20 kilos of *Phlox Carolina*. By methods which are given in some detail, they have isolated at least three substances of different and definite crystalline forms, but only one of which has, up to the present, been examined. This compound, the composition of which approximates to the formula $(C_{11}H_{18})_x$, is the one of the three that is least soluble in alcohol, and is evidently an unsaturated hydrocarbon. It forms silky, acicular crystals, often two or three centimetres in length, which under polarized light give a play of colors. It has decided electrical properties; melting point=196.2° to 196.4° C. Soluble in petroleum ether, ethylic and acetic ether, benzol, chloroform, hot alcohol, glacial acetic acid, acetic anhydride, and linseed oil.—Amer. Jour. Pharm., July 1888, 321–324.

Ozokerite—Occurrence and Development of Deposits in Utah.—According to "Eng. and Min. Jour." a company has been formed, under the laws of New York State, to develop large deposits of ozokerite, a natural paraffin wax existing in the Wasatch Mountains of Utah Territory, about 113 miles east of Salt Lake City. These mines are said to contain the only deposits of this mineral known to exist outside of Galicia, Austria, whence the entire world's supply of this product has, until recently, been obtained. The uses of this mineral are constantly enlarging, and in this country alone the consumption amounts to 500 tons yearly. The price of refined ozokerite, commercially known as ceresin, ranges from 20c. per lb. for chemically pure white down to 6c. per lb. for crude black of a poor quality. The first shipment from the American mines arrived in New York in January of this year, and attracted considerable comment. —Amer. Drugg., June, 1889, 109.

Paraffin—Estimation in Ozokerit and Solubility.—B. Pawlewski and J. Filemonowicz find that the liquid constituents present in many products of the petroleum or ozokerite industry are soluble in glacial acetic acid, whereas vaselin, ceresin, ozokerit and paraffin are almost insoluble. To estimate the quantity of solid paraffin in petroleum, lubricating oils, mineral oils, vaselin, etc., 5–20 c.c. of the mixture is well shaken with 100–200 c.c. of glacial acetic acid, the residual paraffin thrown on to a weighed filter, washed two or three times with glacial acetic acid, and then two or three times with alcohol at 75° Tr., dried and weighed, or the residual paraffin is washed, dissolved in benzene or ether, the solution evaporated, and the residue weighed. This method is quick and accurate, and can be carried out at the ordinary temperature.

The following table gives the solubility at 20° of ozokerit paraffin of sp. gr. 0.9170 at 20°, melting at 64–65°, and solidifying at 61–63°:

Solvent.	Paraffin (grams) dissolved by		Weight of solvent required to dissolve completely 1 part of paraffin.
	100 grams.	100 c.c.	
Carbon bisulphide	12.99	—	7.6
Light petroleum up to 75° C., sp. gr. 0.7233.	11.73	8.48	8.5
Turpentine oil, sp. gr. 0.857; b. p. 158—166°	6.06	5.21	16.1
Cumene (comm.), up to 160°, sp. gr. = 0.867.	4.28	3.72	23.4
Cumene (frac.), 150—160°, sp. gr. = 0.847.	3.99	3.39	25.0
Xylene (comm.), 135—143°, sp. gr. = 0.866.	3.95	3.43	25.1
Xylene (frac.), 136—138°, sp. gr. = 0.864.	4.39	3.77	22.7
Toluene (comm.), 108—110°, sp. gr. = 0.866.	3.83	3.34	26.1
Toluene (frac.), 108.5—109.5°, sp. gr. = 0.866.	3.92	3.41	25.5
Chloroform	2.42	3.61	41.3
Benzene	1.99	1.75	50.3
Ethyl ether	1.95	—	50.8
Isobutyl alcohol (comm.), sp. gr. = 0.804	0.285	0.228	352.0
Acetone, 55.5—56.5°, sp. gr. = 0.797.	0.262	0.209	378.7
Ethyl acetate	0.238	—	419.0
Ethyl alcohol, 99.5° Tr	0.219	—	453.6
Amyl alcohol, 127—129°, sp. gr. = 0.813	0.202	0.164	495.3
Propionic acid	0.165	—	595.3
Propyl alcohol	0.141	—	709.4
Methyl alcohol, 65.5—66.5°, sp. gr. = 0.798.	0.071	0.056	1447.5
Methyl formate	0.060	—	1648.7
Glacial acetic acid	0.060	0.063	1668.6
Ethyl alcohol, 94.5° Tr	0 046	—	2149.5
Acetic anhydride	0.025	—	3856.2
Formic acid (cryst)	0.013	0.015	7689.2
Ethyl alcohol, 75° Tr.	0.0003	—	330000.0

—Jour. Chem. Soc., 1889, 82; from Ber. d. D. Ch. Ge. xxi., 2973.

Ceresin—Adulteration.—W. H. Symons states that ceresine—a crude form of paraffin wax very much resembling beeswax and sometimes substituted for this—has been found by him adulterated to the extent of 53.6 per cent. with a substance having all the characters of rosin. This he believes has been added for the purpose of raising the melting point of ceresine, paraffins of high melting point being derived by manufacturers of soft paraffin, and not, as might be supposed, the lower melting paraffins. The author found the sp. gr. of pure ceresine to be 0.917, melting point 77°C., and alcohol extracted from this 0.8 per cent.; another sample had a sp. gr. 0.914, melting point 69°C., and alcohol extracted 1.4 per cent. The adulterated specimen had the sp. gr. 1.008, and yielded to alcohol 53.6 per cent., while an approximate mixture, made by melting together 4.46 grams of rosin and 5.12 grams of pure ceresine, had the sp. gr. 0.982, and yielded 47.9 per cent. to alcohol. The sp. gr. of the rosin was 1.080.—Phar. Jour. and Trans., Sept. 15, 1888, 205.

Viscous Vaseline—A New Form of Petrolatum.—Dr. G. Vulpius calls attention to a viscous vaseline, produced from Galician crude petroleum,

which possesses advantages over the American vaseline as an ointment base. It is perfectly devoid of acid, odorless, without the slightest traces of granular or crystalline structure, melts at 36° C., and is exceedingly viscous. It is readily mixed with 10 per cent. of water, or 15 per cent. of alcohol or glycerin.—Arch. d. Pharm., Dec. 1888, 1088.

Petroleum Oils—Compounds Used to Destroy their Fluorescence.—E. Geissler examined a yellow powder used for destroying the fluorescence of petroleum oils in the proportion of 0 2–0.3 gm. for 100 c.c. oil; it proved to be nitro-naphthalin. Nitrobenzol also practical this property, although not to such a marked degree. The interesting observation was made that the fluorescence of quinine salts was destroyed by a little of these chemicals. If light be made to traverse solutions of these substances it will not produce the fluorescent effect either upon quinine solutions or petroleum oils; this is explainable by the possible absorption of the blue rays by nitro-benzol and nitro-naphthalin.—Pharm. Centralh., 1889, 11.

Nitrobenzol—Distinction from Bitter Almond Oil—The method usually employed for the distinction of nitrobenzol from bitter almond oil in confectionery, soaps, etc., is too circumstantial and, in the case of its presence in small quantities, too unreliable to be practically useful. K. List recommends a method which is easily applied, and quite reliable. It is based upon the circumstances that when a liquid containing oil of bitter almonds is heated with soda solution, the odor of hydrocyanic acid is destroyed; if then an excess of permanganate is added, the oil of bitter almonds is oxidized, and the bitter almond odor completely removed. Nitrobenzol is not affected by such treatment, its odor prevailing unchanged.—Arch. d. Pharm., Feb. 1889, 126; from Chem. Ztg., 12, 1727.

Beta Naphthol Powders—Formula.—The following formula is said to be frequently prescribed by Dr. Dujardin-Beaumetz in cases of dilatation of the stomach, or to combat secondary fermentation in the stomach and intestines: Beta naphthol, salicylate of bismuth and calcined magnesia, āā 10 gm.; divide in 30 cachets; one before each of the two principal meals.—Amer. Jour. Pharm., June 1889, 289; from Jour. d. Méd., April 1889.

Alpha-Naphthol—Antiseptic Value.—I. Maximovitch has studied the antiseptic action of alpha-naphthol towards fourteen different microbes, and finds that it acts more strongly antiseptic than does beta-naphthol, as recorded recently by Bouchard. At the same time alpha-naphthol is less injurious to the animal organism than beta-naphthol. While insoluble in cold water, one litre of dilute alcohol, containing 40 per cent. of absolute alcohol, will dissolve 10 grams of alpha-naphthol.—Amer. Drugg., Aug., 1888, 142; from Compt. rend.

Naphthol—Method for its Detection in Food.—According to Beebe,

naphthol can be detected in food, for the preservation of which it has lately been used, by extraction with ether, allowing to evaporate and dissolving residue in hot water; the solution is first rendered *faintly alkaline* with ammonia, then *faintly acid* with nitric acid, after which a drop of fuming nitric acid or of a nitrite solution is added, when a rose-red color indicates *naphthol*.—Rundschau, 1888, 623; from Liebig's Annalen.

Camphorated Naphthol—Antiseptic Value.—Désesquelle finds that a mixture of β naphthol 10 gm., and camphor 20 gm., finely pulverized, has identical properties with camphorated phenol. The product is a colorless syrupy liquid, insoluble in water and miscible in all proportions with fixed oils. Its antiseptic properties are superior to those of phenol, and, according to Prof. Bouchard's experiments, it is less toxic. Does it hold its antiseptic properties? If so, this mixture should, for surgical uses, replace the phenol compound.—Amer. Jour. Pharm., Oct. 1888, 510; from Arch. de Pharm., Sept. 5, 1888.

Hydrargyrum Naphtholicum Flavum—A New Medicinal Agent.—E. Bombelon calls attention to a compound of β naphthol and mercury, but withholds the method for its preparation. He lauds it highly as superior to all other mercury compounds hitherto used in dermatology, as well as for internal use in syphilis, as a destroyer of the typhus bacillus, etc. It occurs in commerce as a lemon yellow powder, but may be obtained in crystals; contains 30.8 per cent. of mercury, is neutral, odorless, and insoluble in the usual solvents.—Arch. d. Pharm., Jan. 1889; from Pharm. Ztg., 33, 739.

Thiol—Artificial or "German" Ichthyol.—E. Jacobsen has prepared artificially a substance which exhibits all the chemical characters of ichthyol, and which he has named "thiol" or "German ichthyol." It is prepared by heating the so-called gas-oil, a product of the distillation of brown coal-tar, with the gradual addition of sulphur, to about 215°. Under copious evolution of sulphuretted hydrogen the oil becomes gradually sulphuretted, the product constituting more or less sulphuretted hydrocarbons according to the amount of sulphur used. The product is not of more constant composition than is the ichthyol itself. By further treatment of the crude product with sulphuric acid, a thiosulpho-acid is formed, and by saturating this with ammonia, thiosulphate of ammonium, or thiol, is produced. The artificial compound not alone has all the chemical characters of ichthyol, but its physiological action also appears to be the same.—Arch. d. Pharm., Jan. 1889, 34; from "Der Fortschritt," 4, 372.

Thiol—Constant Quality.—According to L. Reeps and E. Buzzi, thiol is now prepared industrially in a condition of purity and uniformity of composition, the acid impurities present in the products at first made being now completely eliminated. Thiol as well as ichthyol are mix-

tures of sulphuretted, non-saturated hydrocarbons, which, by treatment with sulphuric acid (sulfonation) become soluble in water; the value of these preparations being dependent on the solubility of their sulphur constituent in water. The thiol as now prepared is devoid of the unpleasant odor of the former product, its odor being faintly bituminous, the taste bitter and astringent. Its freedom from all impurities (particularly sulphuretted oils) makes it possible to produce a dry form of thiol, it being now offered in two forms:

1. *Thiolum liquidum*, a 40 per cent. aqueous solution, having the consistence of thick syrup, sp. gr. 1.080 to 1.081 at 15°C.

2. *Thiolum siccum*, constitutes brownish-black shining scales, which may be reduced to impalpable powder, and is useful as an admixture with starch, talc, bismuth, zinc oxide, for the production of dermal powders. It is rapidly and completely soluble in water.—Arch. d. Pharm., June 1889, 511–512; from Pharm. Centralh.

Olea Aetherea sine Terpeno—A Concentrated Form of Volatile Oils.—Dr. Schweisinger speaks highly of concentrated volatile oils, which he designates as "olea aetherea sine terpeno," and which are produced by the removal of the non-fragrant hydrocarbon. They represent from two to thirty volumes of the ordinary essential oils. Thus one volume of the concentrated oil represents two volumes of the oils of anise, cassia, fennel, ginger-grass, mentha crispa, mentha piperita, cloves, sassafras and star anise, two and one-half volumes of the oils bergamot, caraway and lavender, four volumes of cumin and rosemary, five volumes of thyme, six volumes of coriander, eight volumes of calamus, ten volumes of absinth, twenty volumes of juniper, thirty volumes of angelica, lemon and orange. They are more permanent, possess greater solubility in alcohol and water, have a finer odor rendered prominent only on great dilution, and are of constant composition, thus enabling the specific gravity and boiling point to be used as tests of purity. The use in pharmacy suggested is for medicated waters made by agitation of the oils with distilled water and filtering; also for elæosacchara, etc. They should be kept in the dark.—Amer. Jour. Pharm., Sept., 1888, 451–452; from Pharm. Centralh., 1888, No. 25.

Volatile Oils—Essential Conditions to their Accurate Examination.—After a comprehensive and critical review of the methods that have heretofore been communicated for testing volatile oils, O. Wallach remarks that these methods can never lead to reliable results, because the principles upon which they are based lack scientific support. Really reliable methods of examination cannot be determined until the following two conditions are filled:

1. The chemical relations of the substances that are present in volatile oils must be accurately determined, and characteristic and easily executed

reactions must be ascertained in order to establish the identity of the individual constituents.

2. The limit of variation of the individual constituents in reliable oils, according to season and source, must be established.

Much has been done in the first direction, but much remains to be done, and when completed, it will probably be within the province of the larger manufacturing establishments to throw accurate light on the second condition.—Arch. d. Pharm. Jan. 1889, 32; from Phar. Ztg., 33, 690.

Volatile Oils—Distinction by the Aid of Alcoholic Glycerin Solution.—Dr. H. Hager finds that a mixture of equal parts of absolute alcohol and glycerin of sp. gr. 1.259–1.262 serves for the distinction between two classes of volatile oils, as well as the detection of alcohol, oil of turpentine, benzin, benzol, mineral oils, fixed oils, etc. One series of oils yields clear solutions with twice the volume of the reagents, while another to which belong turpentine, petroleum, etc., do not. The solution may be immediate at 16° to 20°, or after shaking a short time. The practical utility of the observation, however, requires further investigation.—Arch. d. Pharm., March 1889, 231; from Phar. Centralh., 30, 65.

Volatile Oils—Detection of Alcohol.—According to H. Hager, adulterations of volatile oils with alcohol can be detected and estimated by agitating the oils with twice their volume of glycerin of sp. gr. 1.215 (contains about 20 per cent. water, which prevents the glycerin from dissolving a portion of the volatile oil) in a graduated tube or cylinder for 5 minutes, and allowing to stand until the mixture separates into two layers; the increase of the glycerin layer is due to the alcohol. If the rate of the cylinder be taken and the oil and glycerin weighed, the oil after separating can be removed by a pipette (the last drops are best absorbed by a piece of filter-paper). The increase in weight of the glycerin is directly due to the alcohol present in the oil.—Am. Jour. Phar., Dec. 1888, 613; from Pharm. Ztg., 1888, 650.

Volatile Oils—Color Reactions.—A. Ihl calls attention to the color reactions of some volatile oils.

Oil of Peppermint dissolved in alcohol after addition of a little finely powdered sugar, gives on heating with HCl or dilute H_2SO_4 an intense blue-green color. Menthol does not give this reaction.

Oil of Cloves, Oil of Cassia, and *Oil of Pimenta,* with an alcoholic phloroglucin solution and HCl give intense red colors; with resorcin in the same way oil of cloves yields a red violet color, oil of cassia a vermilion red color, oil of pimenta a dirty red color.—Am. Jour. Phar., April 1889, 180; from Chem. Ztg., 1889, 264.

Essential Oils—Tincture of Iodine a Test.—"Eck" proposes a method for testing essential oils, which is based upon the property of certain oils to decolorize tincture of iodine, whilst many essential oils do not show

this reaction. The method of applying the test is to dissolve a drop of the oil in question in 3 c.c. of alcohol at not less than 90 per cent., and to add a drop of the tincture of iodine. In a check experiment, in which he added directly oil of turpentine to oil of juniper, and applied the iodine test as above described, the iodine was nevertheless decolorized. In consequence, he distils the oil on the water-bath and applies the test to the first drop which comes over. Iodine is instantly decolorized by oil of peppermint (Mitcham); in a minute by the oils of ginger and juniper; in two minutes by oils of pepper and cardamom; in three to eight minutes by oil of mace. The oils of coriander, caraway, turpentine, rue, sassafras, roses, rosemary, orange, aniseed, fennel, angelica, and wormwood do not decolorize iodine.—Chem. News, Jan. 11, 1889, 25; from Monit. Scient. Quesn., Nov. 1888.

Volatile Oils—Iodine Absorption-Equivalents.—R. H. Davies, having observed that some eucalyptus oil, which had been in contact with iodine solution in iodide of potassium, absorbed iodine to such an extent as to become heavier and finally to sink in the liquid, conceived the idea that the iodine absorption-power of essential oils might, similarly to that of fixed oils, as applied by Von Hübl, yield results of some value in their determination. Von Hübl's method of working is the following: 25 grams of iodine and 30 grams of mercuric chloride are dissolved in absolute alcohol, and the solution made up to 1 litre. Twenty c.c. of this solution are then added to a known weight (0.4 gram) of the oil to be examined, which has been dissolved in 10 c.c. of chloroform, and the mixture is allowed to stand some hours, after which it is diluted with 15 c.c. of a 10 per cent. solution of potassium iodide, then with 150 c.c. of water, and the iodine remaining in the free condition is estimated by titration with standard sodium hyposulphite solution. As the strength of the alcoholic solution varies somewhat with its age, it is necessary to perform a blank experiment with each determination of one or of a series of samples of oil, and from the difference between the amount of hypo solution required for the blank experiment (when no oil is present) and that required for the liquids containing oil, but otherwise exactly similar to the blank experiment, the amount of iodine that has gone from the free to the combined condition through the agency of the oil can easily be calculated. This amount is usually expressed as proportional to 100 parts by weight of oil, and constitutes the "iodine absorption equivalent" of the oil. It is not to be assumed that the number represents the amount of iodine actually absorbed by the oil, since, without doubt, the process is usually, if not invariably, a substitution process, in which, for each iodine atom entering into the composition of the oil, a second combines with the hydrogen thus displaced, and this ultimately forms the familiar mercuric iodide, which can be obtained in crystals upon evap-

oration of the aqueous liquid. The results obtained with essential oils are given in the following table:

Name of Oil.	Whence Obtained.	Iodine Absorption per cent.	Estimations Made.
1. Oil of almonds, essential	English distiller.	No absorp.	Mean of 2 results.
2. " " prussic acid removed	"	"	" 2 "
3. " aniseed, Russian, 1888	"	189.7	" 3 "
4. " bergamot, 1888	Purchased.	276.1	" 2 "
5. " chamomile, 1887	English distiller.	68.1	" 2 "
6. " " 1888	"	72.1	" 2 "
7. " " 1886 or earlier	Purchased.	65.5	" 2 "
8. " caraway, English	English distiller.	254.9	" 2 "
9. " cassia	Purchased.	159.5	" 2 "
10. " celery	English distiller.	311.6	" 3 "
11. " cinnamon	Purchased.	189.5	" 2 "
12. " clove (a) 1887	English distiller.	362.5	" 2 "
13. " " (b), half from clove stems, 1885	"	366.6	One result.
14. " " (c), 1885	"	355.1	"
15. " " (d), 1889	"	349.5	Mean of 3 results.
16. " cubebs (a), 1888	"	226.8	One result.
17. " " (b), 1885	"	223.1	"
18. " " (c), 1889	"	226.0	Mean of 6 results.
19. " cardamoms	"	139.3	" 3 "
20. " cummin, 1877 or earlier	Unknown.	81.6	" 2 "
21. " dill, 1888	English distiller.	257.1	" 5 "
22. " fennel, 1877 or earlier	Unknown.	158.3	One result.
23. " juniper, 1889	English distiller.	337.3	Mean of 3 results.
24. " " foreign	Purchased.	363.9	" 2 "
25. " lavender, English, 1886	Distiller.	265.5	One result.
26. " " Mitcham, 1888	"	274.9	"
27. " " (Mitcham grown) French variety	"	273.9	"
28. Oil of lavender (French grown)	Purchased.	294.5	"
29. " " French (best)	"	262.7	"
30. " " mixed equal parts, French and English	....	286.2	"
31. Oil of lemon, special from agent (a)	....	328.3	"
32. " " (b), 1883	Purchased.	340.3	"
33. " " (c), 1888	....	345.3	"
34. " " (d), 1888	Sample submitted.	348.9	"
35. " " (e), 1888	"	348.0	"
36. " " (f), 1888	"	345.6	"
37. " " (g), 1888	"	355.1	"
38. " nutmeg, English, 1889	English distiller.	308.3	Mean of 3 results.
39. " " foreign, 1888	Purchased.	321.5	" 2 "
40. " parsley, English, 1889	Distiller.	255.0	" 3 "
41. " peach kernel, English	"	No absorp.	
42. " pennyroyal, foreign, 1887	Purchased.	188.9	" 2 "
43. " peppermint, English (a), 1887	Distiller.	51.2	" 2 "
44. " " " (b), 1887	"	49.6	" 2 "
45. " " " (c), 1888	"	57.7	" 2 "
46. " " American (a), 1887	Purchased.	132.2	" 2 "
47. " " " (b), 1888	Sample from importer.	143.9	" 2 "
48. " " " (c), 1888	"	121.8	" 2 "
49. " " " Mitch. (d), 1888	"	81.9	" 2 "
50. " " Japanese (a), 1887	Purchased.	48.1	" 2 "
51. " " " (b), (English grown), 1888	From distiller.	43.5	One result.
52. Oil of rosemary, foreign, 1887	Purchased.	325.0	Mean of 2 results.
53. " sandal wood, English (a), 1888	From distiller.	226.6	" 2 "
54. " " " (b), 1888	"	233.9	" 3 "
55. " savin, foreign, 1881	Purchased.	279.5	" 2 "
56. " turpentine	"	377.0	" 12 "
57. " spearmint, English	"	207.3	" 2 "
58. " calamus, 1888	"	181.4	" 2 "
In addition to these oils, the following solid derivatives of essential oils have been examined:—			
59. Anethol from English oil of aniseed, old	Prepared.	177.4	One result.
60. " " " "	"	182.9	"
61. Anethol from English star-anise oil	"	177.8	"
62. Camphor	Purchased.	0.46	Mean of 2 results.
63. Menthol	Prepared.	0.12	" 2 "
64. Thymol	Purchased.	171.5	" 2 "

Mr. Davies gives a number of details of his experiments, for which reference must be had to the original. It may be stated, however, that he has been enabled to divide essential oils roughly into four classes: (1) those in which the absorption of iodine was very little or none; (2) those in which the reaction was slow in starting, but afterwards considerable; (3) those in which the absorption was moderate only; (4) those in which the absorption was rapid and abundant.—Pharm. Jour. and Trans., April 13, 1889, 821–824.

Terpilen—Conversion into Menthen.—G. Bouchardat and J. Lafont, by acting upon terpin at 100° C. for 15 hours with conc. aqueous hydriodic acid, obtained terpilen-diiodhydrate ($C_{10}H_{16},2HI$) in crystals. On increasing the heat this is decomposed, and an oily layer separates, which when purified by suitable means, is found to be composed of diterpilen ($C_{20}H_{32}$), and menthen ($C_{10}H_{18}$), which are separable by fractional distillation. Menthen has the s. g. at 0° of .837, boils under normal pressure at 167° to 170°, and combines very slowly with hydrochloric acid, forming the monochlorhydrate ($C_{10}H_{19}Cl$), whereas terpilen combines very rapidly at the ordinary temperature with HCl. The menthen so obtained appears to be identical with Oppenheim's menthen.—Arch. d. Pharm., May 1889, 476; from Jour. de Pharm. et de Chim., 1889, xix, 145.

Oil of Mentha arvensis—Character of the Product from Plants Grown in England.—John Moss found the oil of *Mentha arvensis* (Japan peppermint), distilled by himself from plants grown in England, to have a decidedly yellow color; the specific gravity at 62° F. was 0.9107; it commenced to boil at 339° F., the temperature rising 402° F. The specific gravity of the redistilled oil was 0.9117.—Yearbook of Pharm., 1888, 407–409.

Oil of Bergamot—Source of Green Color.—Some question having been raised recently as to the natural color of bergamot oil, Messrs. Schimmel publish some information on the subject, obtained from two of the largest producers in Reggia. One of them says: "This essence occurs for the most part of a brown-yellow color. A certain quantity approximates more to green, but this is an essence prepared only from unripe fruit. In commerce it seldom occurs pure, since it is ordinarily mixed with the essence prepared later from ripe fruit. Carefully examined in a glass tube it cannot properly be called 'green,' but there is always a yellow color perceptible. The emerald green essences which have been exported from Messina are such as have been allowed to stand for a long time in badly-tinned vessels, and the color is due to oxide of copper." The second correspondent says: "After the working of the bergamot fruit the essence obtained is honey-colored, and it is usually put forward and sought for of this color. The green color is acquired when the oil is allowed to stand a certain time—about seven or eight months—in the ves-

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sels; it attacks the tinning, and becomes green through contact with the copper. This is the correct explanation of the two colors; any other is false."—Pharm. Jour. and Trans., April 1, 1889, 803; from "Berichte," April 1889.

Oil of Rose—Distillation in Bulgaria.—An Austrian pharmacist who recently travelled in Bulgaria communicates the following particulars concerning the distillation and adulteration of otto of roses. The distilling apparatus generally used in the country consists of a copper container, and the distillation product is cooled in large wooden vats. One of the largest firms in Kezanlik once tried to introduce modern distilling apparatus, such as is employed in large distilleries in Germany and elsewhere, but it was found impracticable in use. Red roses are used almost exclusively for distilling, because they yield an oil of sweeter aroma, being richer in the aromatic principle of essential oils. But in order to obtain a more easily solidifiable oil, freezing at 14°C., a certain percentage of white roses is added to the red ones, such a mixture yielding a product richer in stearopten than the other. For adulteration, geranium oil, procured from Constantinople, is most frequently used. The oils are not mixed directly, but the rose flowers are sprinkled with geranium oil before distillation, and the adulterant is thus more intimately mixed with the genuine oil than could be the case otherwise. To make this manipulation successful, a majority of white flowers must be used. The distillers are exclusively Bulgarians, mostly small men, although they count among their number a few large wholesale dealers.—Amer. Drugg., Nov. 1888, 212; from Chem. and Drugg.

Oleum Rosæ—Yield from Roses in Turkey.—The Sultan's chemist, Bowkouski Bey, gives the percentage of the product obtained from a given number of roses. It has been hitherto considered a manufacturer's secret. The number of roses required for one ocque (1284 gm.) of distilled rose-water of good quality is given at 700. About 3000 kilogm. of roses are required to make one kilogm. of the oil. By hurrying the distillation, 1 kilogm. of oil may be had from 2,500 kilogm. of flowers, but the oil is not so fine as the first.—Rev. Med. Phar., Constantinople; Arch. de Phar., June 5, 1888; Amer. Jour. Pharm., July 1888, 347.

Thymol—A New Reaction.—According to L. van Itallie, if a few drops of solution of potassium hydrate are added to a liquid containing thymol, followed by sufficient solution of iodine in iodide of potassium to produce a faint yellow color, and the liquid is then gently heated, a handsome red color is produced, which increases slowly in intensity, but disappears on prolonged standing, or when the liquid is heated strongly, a colorless precipitate being produced. The reaction is quite sensitive, a distinct red color being produced in solutions containing $\frac{1}{10000}$ of thymol. Other phenols, examined by the author, do not appear to give this reaction.—Arch. d. Pharm., March 1, 1889, 228.

Oil of Calamus—Distinction of the Japanese from the European Oil.—Messrs. Schimmel and Co. state that the Japanese calamus roots do not differ externally from European calamus roots, and are no doubt derived from the same species. They contain 5 per cent. of a highly aromatic essential oil, which is considerably heavier than the German calamus oil, having a specific gravity of 0.991 at 16° C. It boils between 210° and 290° C.; if the distillate be collected in two fractions, the lower portion has the characteristic calamus odor, while the higher boiling portion gives off the peculiar sesquiterpene odor. Japanese calamus oil also differs from the European in solubility, 1 part dissolving in 500 parts of 50 per cent. spirit, the German oil requiring 1000 parts of spirit.—Pharm. Jour. and Trans., April 6, 1889, 804; from "Berichte," April 1889.

Volatile Oil of Chamomile—Preservation of Blue Color.—Messrs. Schimmel and Co. state that in order to prevent as much as possible the original blue color of this oil from changing to green, it is recommended that it should be protected carefully from the influence of light and heat.—Pharm. Jour. and Trans., April 6, 1889, 804; from "Berichte," April 1889.

Oleum Eucalypti globuli—Composition.—Voïry has subjected the volatile oil of eucalyptus globulus to fractional examination, and has determined several new constituents. By fractioning the oil in a partial vacuum, an acid aqueous liquid was first obtained, containing formic and acetic acids; between 70° and 100° C. unpleasantly odorous liquids were obtained, possessing in general the characters of aldehyde, and forming solid substances with bisulphite of sodium. Both valerianic and butyric acids were isolated from these fractions. Between 100° and 150° C. a mixture of various hydrocarbons distilled over, but the main portion of the oil (about two-thirds of the whole quantity) distilled over between 150° and 175° C. By refrigeration in appropriate apparatus he obtained *crystalline eucalyptol*, which by remelting and congealing a number of times, to secure the complete removal of the liquid portion, was perfectly pure. *Pure eucalyptol* melts at +1° C., has the composition $C_{20}H_{18}O_2$, and is optically inactive. Above 175° C. the author obtained ethers of butyric, acetic, and valerianic acid, as well as resinous substances, and, finally, he has determined the presence of a body containing sulphur, which is readily decomposed by heat with elimination of sulphuretted hydrogen.—Arch. d. Pharm., Sept. 1888, 799; from Jour. de Pharm. et de Chim., 1888, xviii, 49.

Cajeput Oil—Constituents.—By fractioning oil of cajeput under ordinary pressure, Voiry obtained, besides small quantities of dextro-rotatory terebinthin, and some benzaldehyd, at a temperature below 160°C., cajeputol (identical with eucalyptol) as principal product. Under diminished pressure, between 130° and 140°C., he then obtained a liquid which, when properly purified, was found to be terpilenol. Terpilenol is identi-

cal with the alcohols that are isomeric with borneol. It congeals at —15° C., has the s. g. 0.947, the composition $C_{10}H_{18}O$, and forms, like the borneols, a dichlorhydrate of the composition $C_{10}H_{16}.2HCl$. It is indifferent to polarized light.—Arch. d. Pharm., Sept. 1888, 852; from Jour. d. Pharm. et d. Chim., 1888, xviii, 149.

Oil of Cajeput—Examination of Commercial Samples.—William West communicates the results obtained in the examination of fourteen samples of commercial oil of cajeput. The color of these samples ranged from "pale bluish green," which is the character given in the British Pharmacopœia, to "full bluish green;" the specific gravity at 15.5° C. from 0.9226 to 0.9240; and the boiling point from 174° to 174.5° C. No difference in odor could be detected between the samples, even on boiling. It would therefore appear that the article at present supplied as cajeput oil is fairly uniform in character. Copper was found in every sample, which agrees with Mr. Histed's experience in 1872. Another sample that had been kept in stock for a long time was pale-brown, and the specific gravity only 0.9194. Guibourt says that an oil distilled by himself from *Melaleuca* leaves had a fine green color; but Histed says that ordinary cajeput oil after being re-distilled is white, though it becomes again green if placed in contact with copper turnings. Mr. West incidentally called attention to the fact that for histological purposes this oil is to be preferred to oil of cloves in transferring sections from alcohol to Canada turpentine, as it penetrates more quickly than oil of cloves, and is expelled more readily from the turpentine afterwards.—Yearbook of Phar., 1888, 363–368.

Oil of Cajeput—Purity of the Direct Imported Oil.—Referring to a large consignment of cajeput oil from Macassar, Messrs. Schimmel state that according to their experience cajeput oil directly imported is always genuine and trustworthy, but that in intervening commerce, and, as they hear, especially in America, it gets adulterated with camphor oil. On practical grounds an adulteration with eucalyptus oil is not to be feared, as that oil is more costly.—Phar. Jour. and Trans., April 6, 1889, 804; from "Berichte," April 1889.

Oil of Camphor—Components, etc.—Henry Trimble and Herman J. M. Schroeter, have made a comprehensive examination of oil of camphor. They give a brief description of eight commercial samples, but selected two of them, both of undoubted purity, the one obtained in quantities from Mr. Samuel F. Simes, of Philadelphia; the other from Fritzsche Brothers, of New York, for their present examination. They describe the method and character of their experiments—which were made principally with the sample from Mr. Simes—and conclude that oil of camphor, as represented by these characteristic samples, contains the following distinct and definite compounds, with a close approximation to the percentage named:

	Boiling point.	Per cent.	Formula.
(1) From 145°–155°C	150°	0.40	$C_{10}H_{16}$
(2) " 158°–161°C	159°	12.00	$C_{10}H_{16}$
(3) " 167°–169°C	168°	13.00	$C_{10}H_{16}$
(4) " 170°–171°	171°	5.00	$C_{10}H_{16}$
(5) " 175°–177°C	176°	15.00	$C_{10}H_{18}O$
(6) " 180°–182°C	180°	4.00	$C_{10}H_{16}$
(7) " 202°–206°C	204°	10.00	$C_{10}H_{16}O$
(8) " 212°–214°C	213°	30.00	$C_{10}H_{18}O_2$
(9) " 230°–235°C	232°	7.00	$C_{10}H_{10}O_2$
(10) " 245°–248°C	247°	2.00	$C_{10}H_{12}O_2$
(11) " 250°–280°C		1.60	Green oil.

The authors do not consider that the above lighter fractions have been so satisfactorily identified, as to warrant naming them. The others have already been named by previous investigators, and were fully identified by the authors. It is possible that (6) consists of dipentene, since Wallach discovered considerable quantities of it in the camphor oil. (5) may be cineol, but they have been unable to get all the reactions necessary for its identification. The odor, however, is characteristic, and strongly points to the possibility of cineol being present, but the polarization is decidedly different from that obtained from wormseed oil, which is inactive. Since it has become known that the high boiling fractions of the oil are so valuable, it will be safe to conclude that the colorless rectified oils of low specific gravity do not contain all the compounds which naturally belong in this complex substance—Amer. Jour. Pharm., June 1889, 273–283.

Volatile Oil of Camphor—Composition and Use of the Light boiling Portion.—Messrs. Schimmel & Co. state that, under the name of "camphor oil," the light-boiling portion of the crude camphor oil appears to find enormously increasing industrial application as a substitute for turpentine oil. More detailed information is now given concerning its characters and composition. It is stated that after the preliminary runnings, smelling disagreeably of aldehydes and acids, the oil begins to boil at about 158° C. The first fraction, boiling between 158° and 162° C., consists of right-handed pinene, identified by the formation of the hydrochlorate, $C_{10}H_{16}HCl$, as well as of nitrosoterpene, melting at 130°, obtained by treatment of pinene nitrosochloride with alcoholic potash. In the portion boiling between 169° and 171° phellandrene was detected, but in very small quantity; it was identified by its nitrite, melting at 102°. Dipentene was found in camphor oil by Wallach, and the tetrabromide and nitrosylchloride compound may be easily obtained from the fraction boiling at 180°. The occurrence of terpineol in camphor oil has not been determined with certainty. Whilst the formation of a compound having the composition $C_{10}H_{16}2HI$, as well as of terpin hydrate, dipen-

tene and terpinene, rendered its presence highly probable, it was, on the other hand, rendered doubtful by repeated failures to obtain the dipentene dihydrochlorate and tetrabromide. There is also in camphor oil a considerable quantity of a hydrocarbon, boiling at 260° to 270°, from which was obtained the hydrochloric acid compound, melting at 117°, characteristic of the sesquiterpene cubebene. In the highest boiling fractions of camphor oil occurs an intensely blue colored oil, which is probably identical with the constituent boiling at about the same temperature, occurring in chamomile, millefolium, wormwood and other oils. The constituents of camphor oil found up to the present are:

Boiling Point.	*Constituent.*	*Formula.*
158°–162°	Pinene	$C_{10}H_{16}$.
170°	Phellandrene	$C_{10}H_{16}$.
176°	Cineol	$C_{10}H_{18}O$.
180°	Dipentene	$C_{10}H_{16}$.
204°	Camphor	$C_{10}H_{16}O$.
215°–218°	Terpineol	$C_{10}H_{17}OH$.
232°	Safrol	$C_{10}H_{10}O_2$.
248°	Eugenol	$C_{10}H_{12}O_2$.
274°	Sesquiterpene	$C_{15}H_{24}$.

—Phar. Jour. and Trans., April 6, 1889, 804; from "Berichte," April 1889.

Camphoric Acid—Medicinal Application.—Camphoric acid was first recommended by Reichert as a remedy in affections of the mucous membrane of the respiratory passages. Lately it has been thoroughly tested by Niesel in the medical elinic at Griefswald. It was found that a 1 per cent. solution of it, effected by means of an alkali, when used by way of inhalation upon consumptives, almost always produced a diminution of expectoration and of a desire to cough. The same solution was found useful in chronic cystitis, being used as injection. Its greatest usefulness, however, was found to be the reducing effect it had upon the night sweats of consumptives. For this purpose it was given in doses of 1 gm. (15 grains), or even 2 gm. (30 grains); or 1 Gm. (15 grains) three times daily.—Amer. Drugg., Dec. 1888, 226; from Deutsch. Med. Wochensch.

Borneol—Physiological Action.—Dr. Ralph Stockmann communicates the results of a very complete investigation of the pharmacology of three substances, viz.: "Borneo Camphor," "Ngai Camphor," and a body prepared artificially from oil of turpentine. These are identical in chemical composition, and possess the formula $C_{10}H_{18}O$; they differ, however, in their action on polarized light. For comparison the pharmacology of ordinary laurel camphor ($C_{10}H_{16}O$) and menthol ($C_{10}H_{20}O$) was also investigated. The result shows a general similarity of action in the different members of this "camphor group," agreeing in all essential points

with our previous knowledge of camphor, but by placing that knowledge on an experimental basis, Dr. Stockmann's researches may do something towards increasing the usefulness of a drug possessing valuable therapeutic properties, but which is apt to be looked upon as obsolete for any active purpose. From his experiments Dr. Stockmann concludes:

(1) That the camphor group is closely allied to the alcohol group in physiological action—menthol approaching it most nearly; as the number of H atoms diminishes in the different camphors, we get an increased tendency to produce convulsions of cerebral origin.

(2) That pharmacological investigation confirms the value of these drugs in cases of increased spinal excitability.

(3) As cardiac stimulants they are closely allied to alcohol, but, in addition, they directly dilate the peripheral vessels—an action which Kobert has shown not to be produced by ethyl alcohol.

(4) Borneol is less irritating locally than common laurel camphor, and could be given in much larger doses without causing untoward cerebral symptoms.—Jour. Physiol., Aug. 1888; Med. Chron., Nov. 1888, 145.

Oil of Bay (Oleum Myrciæ acris)—Constitution.—Otto Millmann has subjected the volatile oil of *Myrcia acris* to comprehensive chemical examination and study, as the result of which he has established the presence in this oil of the following bodies:

1. *Three terpenes*, viz., *pinen*, *dipenten* (not certain but probable), and a *polyterpen* (probably *diterpen*).

2. *Eugenol*, the principal constituent.

3. The *methyl ether* of *eugenol* in smaller quantities.

The oil examined had a dark-yellow to brown color, a peculiar spicy odor, reminding of cloves, and an acrid taste—s. g. 0.970 at 15°. No separation of solids resulted on exposure to a freezing mixture. Readily soluble in ether, petroleum ether, bisulphide of carbon and chloroform. but it formed a turbid mixture with alcohol.—Arch. d. Pharm., June 1889, 529–548.

Oil of Bay—Incorrect Pharmacopœial Description.—Geo. M. Beringer calls attention to the fact that the description of oil of bay given in the U. S. Pharmacopœia is incorrect in several particulars. The sp. gr. is not 1.040, but, in conformity with previous experiments of Prof. Maisch, it is lighter than water. Seven authentic samples were examined, and found to have the following sp. gr.: 0.970, 0.9716, 0.9672, 0.9696, 0.9765, 0.9810, and 0.9828. As to its solubility in alcohol, also, the statement of *complete* must be modified, since the oil does not form a *clear* solution in alcohol of any strength or proportion. Oil of bay is frequently adulterated with such oils as oil of pimenta, cloves and copaiba. The author made some experiments to determine whether the addition of the oils of pimenta or of cloves has any influence on its solubility. He finds that by the addition of 20 per cent. of oil of pimenta,

the turbidity of a solution in alcohol is very much lessened, and practically obliterated in the case of an oil containing 50 per cent. of oil of pimenta. The following tests for the presence of oil of pimenta or cloves in oil of bay are considered of value by the author: To three drops of oil of bay, in a small test tube, add three drops of pure sulphuric acid (1.84). Tightly cork the test tube and stand aside for half an hour until the reaction is complete and the oil is resinified. Add 60 minims of 50 per cent. alcohol and shake vigorously, gradually warm the mixture, agitating it continuously until the alcohol boils. With pure oil of bay, the resin will form an insoluble mass, the alcohol remaining almost colorless, or acquiring a pale, brownish-yellow color, not red or purplish red.

Oil of pimenta, similarly treated, will yield a resinous mass, considerable of which dissolves in the dilute alcohol, yielding a bright red or red-brown solution.

Oil of cloves similarly treated yields a resinous mass, which almost entirely dissolves in the dilute alcohol, yielding a bright red solution, soon acquiring a purplish-red fluorescent color.

Oil of bay, adulterated with ten per cent. of pimenta, will give a distinct red-brown solution, and five per cent. of oil of cloves can be easily detected by the purplish-red fluorescence.—Amer. Jour. Pharm., Sept. 1888, 441–445.

Bay Oil—Uncertainty as to Specific Gravity.—F. H. Alcock observes that there exists much uncertainty about the character of bay oil, more especially with regard to its specific gravity. The U. S. P. says the sp. gr. should be 1.040; but it has been shown that oil of this gravity can be obtained only by fractional distillation, and that the true figure is less than 1.000. In the English market there is the same uncertainty. The author obtained three samples from different English wholesale houses, and found them to be "dark brown," "much darker" and "light straw color" respectively, and to have the sp. gr. in the same order, 0.9813, 0.9827 and 0.9289. The odors were markedly different.—Pharm. Jour. and Trans., Nov. 24, 1888, 409.

Oil of Bay—Use to Keep Away Flies.—It is stated that the expressed oil of bay is effectually used by butchers in Switzerland to keep their shops free from flies, a coating of the oil being applied to the walls. In France the oil has been used with equal success to keep the flies away from picture frames, chandeliers, etc., by coating these objects with the oil.—Amer. Drugg., Sept. 1888, 176.

Oil of Anise—Distinction of the Product from Star Anise from that of Pimpinella Anisum.—John C. Umney observes that inasmuch as the greater portion of the oil of anise of trade is that of star-anise—according to his information a thousand pounds for every pound of oil of *pimpinella anisum*—it is desirable to have some reliable and easily distinguishing test between the two oils. He finds such, not in the congealing point of

the two oils, as usually given, but in the difference in their behavior to an alcoholic solution of hydrochloric acid, as proposed by Eykman. The latter consists in treating the oil with a saturated solution of hydrochloric acid gas in absolute alcohol, which reagent affords with "pimpinella" oil a beautiful manganese pink, whilst with "illicium" oil only a pale brown color is shown, as will be seen by reference to the table. The test is more strikingly apparent with the "natural" oils, than with oils that have been subjected to rectification; but even in the latter case, it is still sufficiently delicate to admit of no confusion. The test of the congealing point is incorrect and unreliable, because oil of star anise has a *true congealing point* considerably above that which is usually given, and which latter may be termed its *abnormal congealing point*. When a liquid solidifies after being cooled below its normal freezing point, the solidification is accompanied by a disengagement of heat, which is sufficient to raise its temperature from the point at which solidification begins up to its *ordinary or true congealing point*. This physical law and its application to anise oils is the key-note to the author's objection to the usual test of distinction. The solidifying points of star anise oil hitherto quoted have been *abnormal ones*, due to their determination whilst the fluid was at rest. The *true congealing point* is the temperature to which the thermometer immediately rises, on this solidification taking place. The oil of pimpinella does not present such a marked difference in respect of its *abnormal and true* congealing points, but it is shown in the following table that these present strange dissimilarity in the case of star anise oil.

Source of Oil.	Abnormal solidifying point.	True solidifying point.	Color reaction with alcoholic HCl.
	Fahr.	Fahr.	
Star anise (German)	31	52	Yellowish brown.
Star anise (own distillation) .	24	49	Yellowish brown.
Star anise (direct import from Macao, China).	34	56	Pale brown.
Star anise (broker's sample) .	36	54	Brown.
Anise fruit (German)	50	59	Manganese pink.
Anise fruit (own distillation).	50	59	Manganese pink (fading quickly).

The table shows satisfactorily that the margin allowed by the British, the United States, and other Pharmacopœias, for the pimpinella oil, viz.: from 50° to 60° F., is practically the difference between the abnormal and normal solidifying points, and is therefore correct, but that the congealing point quoted for star-anise oil is its *abnormal one*, and is therefore, the author considers, incorrect. Moreover, that between the true or *normal* solidifying points of pimpinella and illicium oils there is prac-

tically no difference, and it is only between their *abnormal* congealing points that a wide divergence exists.—Pharm. Jour. and Trans., Feb. 16. 1889, 647–649.

Anisic Acid—Use as an Anti-rheumatic.—It is observed by "Chem. and Drugg." that though anisic acid is not a new substance, it is now about to be introduced into therapeutics for use in diseases similar to those for which sodium salicylate has been employed. It may be prepared in at least two ways: First, by the oxidation of anise oil or anethol with nitric acid or chromic acid. The reaction is represented as follows.

$$\underset{\text{Anethol}}{C_6H_4\begin{cases}CCH_2\\CH:CH.CH_3\end{cases}}+2O_2=\underset{\text{Anisic acid}}{C_6H_4\begin{cases}OCH_3\\CO_2H\end{cases}}+\underset{\text{Acetic acid.}}{C_2H_4O_2}$$

It is also produced by the oxidation of para-cresolmethyl ether:

$$C_6H_4\begin{cases}OCH_3\\CH_3\end{cases}$$

It crystallizes from hot water in needles, and from alcohol in rhombic prisms, melting at 185° C., boiling at 280° C., and subliming undecomposed. Its salts are readily crystallizable and very soluble. The acid will be introduced into commerce chiefly as the sodium and phenol compounds represented as follows:

$$\underset{\text{Sodium anisate}}{C_6H_4\begin{cases}OCH_3\\CO_2Na\end{cases}} \qquad \underset{\text{Phenol anisate.}}{C_6H_4\begin{cases}OCH_3\\CO_2C_6H_5\end{cases}}$$

The latter melts at 75° or 76° C. Therapeutically, it will, as already indicated, be introduced as an antirheumatic, antineuralgic, etc. Curci recommends it to be given in the same doses as sodium salicylate. It is said to be well tolerated, to be equal in medicinal virtue to the salicylate mentioned, but destitute of the sometimes unpleasant effects of the latter.—Amer. Drugg., Jan. 1888, 10.

Oil of Sassafras—Poisonous Effect.—Dr. L. M. Albright states a case in which a teaspoonful of oil of sassafras was taken by a young man, producing hallucinations, vomiting, prostration, cold extremities, low pulse, somewhat dilated pupils and stupor. The treatment commenced two hours after taking the oil, and consisted in rest, heat to the extremities, and egg-nog. The patient soon regained consciousness, and was ready for breakfast the next morning.—Amer. Jour. Phar., March 1889, 116; from Cinc. Lancet-Clinic, Dec., 1888.

Volatile Oil of Betel Leaves—Re-examination.—In a previous report Messrs. Schimmel & Co. had made the statement that the essential oil of betel leaves contained eugenol. This being in contradiction to the results obtained by Professor Eykman with a sample of betel oil examined by him, a fresh investigation was made with the following result. The

sample of betel oil examined was a slightly brown colored liquid, sp. gr. 1.024 at 15° C. It consisted up to about two-thirds or three-fourths of a phenol, the boiling point of which in partial vacuum, under a pressure of 12 mm., lay at 131–132° C.; under ordinary atmospheric pressure it underwent decomposition on boiling. The specific gravity of the phenol was 1.067 at 15° C. Examination of the oxidation products, acetyl compound and methyl ether, showed that this compound was not eugenol, but an isomer, the composition of the new compound and of eugenol being represented as follows:

New Compound.	Eugenol.
$[^1]C_3H_5$	$[^1]C_3H_5$
$C_6H_3[^3]OH$	$C_6H_3[^3]OCH_3$
$[^4]OCH_3$.	$[^4]OH$.

The second constituent of betel oil boiled practically between 250° and 275° C., had a very agreeable tea-like odor, and consisted for the greater part of a sesquiterpene ($C_{15}H_{24}$), cubebene, which is characterized by its dihydrochlorate melting at 117–118° C. This composition differs considerably from that given by Professor Eykman, but how far the difference may depend upon the oil examined by Professor Eykman having been distilled from fresh leaves, whilst that examined by Messrs. Schimmel was distilled from dried leaves, has not been determined.—Pharm. Jour. and Trans., April 6, 1889, 803; from "Bericht," April, 1889.

Oil of Cassia—Shameful Sophistication—Messrs. Schimmel & Co. state that the greater part of the oil of cassia found at present in commerce is sophisticated in the most shameful manner. The oil appears to be obtained by the dealers in Hong Kong, Macao and Canton through native agents, who get it direct from the Chinese who produce it. As to the particular place from which it comes no information is available; only this is certain, that it is not manufactured in Macao, the place designated on all the labels. It is therefore thought most probable that it is sophisticated by the producer, and sent in this condition into the market. In Hong Kong it is the custom among the dealers to have the oil examined in a "medical hall," and its genuineness certified. The value of this guarantee may be judged from the fact that a sample certified to be unadulterated oil of cassia, 1.060 sp. gr., dissolving readily in alcohol of 80° Tr. and perfectly volatile, proved to contain 20 per cent. of solid resin—colophony or pitch—and a corresponding quantity of petroleum, probably added to regulate the specific gravity and consistence. The three following brands are mentioned as having been found grossly adulterated: yellow label with the American eagle, Yan Loong, Macao; yellow label with sailing-vessel, Cheong Loong, Macao; rose-colored label with wreath of flowers, Luen Tai, Macao. The oil was noticeable superficially for its dark brown color and consistency. Upon shaking it in a flask it

remained adherent to the sides for a long time. The specific gravity corresponded tolerably well with the statement in the certificate, varying between 1.052 and 1.065. The boiling-point lay between 200° and 265° C. As a residue after distillation there remained in the retort from 23 to 26 per cent. of a solid brittle resin. In order to exclude any doubt as to whether this resin might possibly have resulted through heating over an open fire, several canisters of each of these brands of oil were submitted to distillation in a current of steam. The greater part of the distillate sank in the water, but a portion collected on the surface, and this lighter portion was identified as petroleum. In the residue after distillation there was found from 19 to 26 per cent. of the same solid brittle resin. On the other hand, a brand bearing a red label, with the words, "Best Cassia Oil, Ying Chong, Macao," has been found to be of good quality, the loss on rectification being only 7 per cent., and the residue being liquid. The rectified oil should have a specific gravity of 1.055 to 1.065.—Pharm. Jour. and Trans., April 20, 1889, 842; from "Berichte," April 1889.

Oil of Cinnamon Leaf—Question of Profitable Production.—A Cingalese paper, the "Sandaresa," strongly advises the natives of Ceylon to give up the distilling of cinnamon leaf oil, which they now manufacture in large quantities, and distil bark oil instead. Several persons, the journal in question observes, manufacture and export cinnamon leaf oil in spite of the small remuneration they get through it. In the Negombo district the distillation is not done by the proprietors, but by outsiders, who pay a small sum in consideration of the leaves they get. If a distiller were to produce 100 bottles per month (which is the highest average he could attain), and sell these at the rate of 1 rupee per bottle, he would get barely 15 rupees profit. On large estates leaves are obtainable during eight months of the year, and if the distiller is very active he will be able to earn 120 rupees per annum. The sum paid to the estate owner for the leaves and fuel is only 5 rupees per month. But it is clear that the cinnamon estates must lose by the carrying away of the leaves in consideration of such a small sum as 5 rupees, the leaves being a valuable fertilizer. Ceylon exports annually about 10,000 bottles of cinnamon oil, which, on account of its low price, is used in the manufacture of soap and perfumery. If there were no leaf oil the manufacturers would have to use oil made of bark, and thereby cause a good demand for low quality bark. To make up for 10,000 bottles leaf oil, they would at least require 5,000 bottles of bark oil, and to manufacture this quantity, 2,500,000 lbs. of coarse bark, at the rate of 500 lbs. per bottle, would be wanted. Therefore, it is advisable to leave off the small profits obtained through the distillation of leaves, in consideration of the higher demand arising in the market for the bark.—Amer. Drugg., Dec. 1888, 222; from Chem. and Drugg.

Oil of Mustard—Presence and Detection of Carbon Disulphide.—It having been determined by Hoffman that carbon disulphide may be a natural constituent of the volatile oils of *Sinapis juncea* and of *Brassica nigra*, as well as of the artificially prepared oil of mustard, Paul Birkenwald has tested different specimens of volatile oil of mustard by the following method:

1 c.c. of the oil is measured into a tared stoppered flask, the weight of the oil ascertained, 10 c.c. absolute alcohol added to dissolve the oil and agitated after addition of 20 drops of an alcoholic potassium hydrate solution until the odor of the oil has entirely disappeared. The contents of the flask are then dissolved in water, acidulated with acetic acid, and titrated with $\frac{1}{10}$n. copper sulphate solution (12.47 gm. per liter). The end of the reaction is ascertained by obtaining a red coloration or precipitate if a drop of solution is placed on blotting paper and a drop of potassium ferrocyanide solution added. Each c.c. of the copper solution represents 0.0086 gm. carbon disulphide.

According to age and quality of the oil, from 8.14 per cent. to 41.03 per cent. of CS_2 were found; self-prepared oil of mustard contained from 9.82 per cent. to 10.82 per cent., diminishing in a year's time to 2.03 per cent. (one specimen to 0.91 per cent.) of CS_2; the artificial oil averaged 10.78 per cent. The origin of the CS_2 is not definitely made out, but the decomposing effect of steam and the presence of $KHSO_4$ influence its formation; by heating oil of mustard with $KHSO_4$ an increase of CS_2 from 0.45 to 2.29 per cent. was observed. The oil obstinately retains the carbon disulphide, and they can not be separated completely by distillation.—Am. Jour. Phar., Nov. 1888, 556; from Schwz. Wochenschr. f. Phar., 1888, 277.

Oil of Mustard—Determination in the Seeds of Cruciferous Plants.—For the determination of oil of mustard in the seeds of cruciferous plants, O. Foerster places in a retort 25 gms. of the substance, previously pulverized and triturated with water. A current of steam is caused to traverse the retort and condense in a descending refrigerator, the end of which plunges for some centimetres below the surface of 50 c.c. of alcohol saturated with ammonia and placed in a ¼ litre flask. The distillation is stopped when the volume of the condensed liquid amounts to 200 c.c. This liquid contains the thiosinnamine, and it is left for 12 hours in the stoppered flask. It is then heated in a beaker with an excess of mercuric oxide (freshly prepared by precipitating mercuric chloride with potassa), and heated with constant stirring. Before cooling a sufficiency of potassium cyanide is added, and the liquid is stirred until the precipitate of sulphur is freed from all foreign matters. It is then filtered, washed, dried, and weighed. The weight multiplied by 0.4266 gives the weight of thiosinnamine.—Chem. News, Febr. 15, 1889, 85; from Jour. de Pharm. et de Chim., 1889 No. 3.

Oils of Lavender and Rosemary—Tests of Quality.—H. Eckenroth recommends the following tests for the oils of lavender and of rosemary:

1. *Lavender Oil.*—It should be colorless or very slightly yellow, and have a specific gravity of 0.885 to 0.895. It must be miscible with 90 per cent. alcohol in any proportion. 10 c.c. of the oil and 10 c.c. of alcohol of 0.895 sp. gr. should give a turbid mixture, whereas the mixture with 30 c.c. should be clear. 5 c.c. of the oil, shaken with a few grains of magenta, should remain uncolored. 90 per cent. of the oil must distil below 210° C.

2. *Rosemary Oil.*—The oil must be colorless or slightly yellow. 10 c.c. of it mixed with 15 c.c. of 90 per cent. alcohol, should give a clear solution. 5 c.c. shaken with a few grains of magenta, should remain uncolored. 90 per cent. of the oil must distil below 175° C.—Chem. Zeit. and Journ. S. Chem. Ind., Amer. Drugg., Jan. 1889, 10.

Angelica Oil—Distinctive Characters of the Japanese and German Oils.—Messrs. Schimmel and Co. report that the results obtained from a parcel of angelica root imported from Japan differ essentially from those experienced with the German drug. The Japanese roots have the same tufted form as the German, but are lighter and nearly white, and are provided with stronger rootlets. They are referred to one of two species, *Angelica refracta*, Fr. Schmidt (Jap. "*Senkiyu*"), or *A. anomala*, Lall. (Jap. "*Biyakushi*"), both of which, according to Rein, are cultivated in the open fields of Japan. This Japan angelica root proved to be comparatively very poor in essential oil, the yield being only one-tenth per cent., the oil also being essentially different from commercial angelica oil. Whilst the German distillate has a specific gravity of 0.853 at 20° C., that of the Japanese is 0.912 at the same temperature. At 10° it gives a separation of crystals, and at 0° it solidifies to a paste. The crystalline mass obtained by cooling and draining had the properties of a fatty acid melting at 62°–63° C. The oil boils between 170° and 310° C., the last portion that passes over having a beautiful blue-green color. The residue solidifies upon cooling and consists principally of the non-volatile fatty acid. The odor of the oil is unusually intense and persistent, more acrid than that of the German angelica oil, possessing but the characteristic suggestion of musk. The cost of this oil deprives it of any industrial importance.—Phar. Jour. and Trans., April 6, 1889, 803; from "Berichte," April 1889.

Myrtle Oil and Myrtol—Characters, etc.—Prompted by the increased use of myrtle oil and myrtol in affections of the respiratory organs and of the bladder, E. Jahns has subjected them to chemical examination. The myrtle oil of Spanish origin (in contra-distinction from a Corsican oil which is also found in commerce distinguishable by a finer odor) is of a light yellow color, is dextrogyre and has, at 10° C., the specific gravity

0.910. It commences to boil at 160°, and fractioned, eighty per cent. distil over below 240°; the residue is stated to consist of resinified and polymerized terpenes. From the different fractions between 160° and 240° were isolated 1, a terpene, very probably dextrogyre-pinene, boiling at 158—160°; 2, Cineol, $C_{10}H_{18}O$, boiling at 176°—this could not be obtained pure simply by fractional distillation but by application of Wallach's method (passing dry HCl through the chilled fraction, draining the crystalline magma, decomposing this with water, warming with dilute KOH, washing the separated oil with water, drying and distilling over metallic sodium) it was obtained; 3, a camphor-like body boiling between 195 and 200°, which could not be isolated perfectly pure, but its behavior towards metallic sodium and the results of an ultimate analysis point towards the formula $C_{10}H_{16}O$. The so-called myrtol was found to be a mixture of dextrogyre pinene and cineol, and is more appropriately called *rectified myrtle oil.* The use of myrtol is recommended to be discontinued, giving way to eucalyptol, identical with cineol; the presence of the terpene and the irritating effect of this substance on the respiratory organs being the cause for the above suggestion.—Arch. d. Pharm., Feb. 1889, 174–177.

Oil of Citronella—Source, Characters, etc.—Charles Ault, in view of the meagre information contained in authoritative works upon the subject of oil of citronella, has collected information from various parties interested in the essential oil trade, among these Messrs. Winter and Son, of Boddagana, Ceylon, and communicated the results of his inquiries to the Missouri Pharm. Association (1888). It appears from these inquiries that the plant from which oil of citronella is obtained is known botanically as

Andropogon Nardus, L., or *A. Martini*, Roxb., being known under the latter name in Ceylon. The plant has broad, bright, green blades from three-fourths to one inch wide, in length averaging four feet, and has roots growing very near the surface of the soil. It flowers annually, and is easily propagated by dividing up the roots. It can be cut every four years, according to the nature of the soil. An acre of A. Martini yields about thirty-six bottles of twenty-two ozs. each of the oil—792 ozs. annually per acre. The outfit required for distilling the oil consists of a boiler, two cylindrical stills, condensing worm, cold water tank, and a receiver. The grass is packed as tightly as possible into a still, which has a perforated false bottom with an egg-shaped outside bottom, and has a condensed-water cock; the cover and goose-neck are fixed on and connected with the condenser, steam is turned on at 40 lbs. pressure. The condensed steam and oil are caught in the receiver, the floating oil is skimmed off into bottles, which are allowed to stand to clear for a few days, and is then filtered, corked and packed for shipment. Only one still is in use at a time, the other being meanwhile filled and got ready.

The lids and goose-necks are interchangeable. The oil should be almost colorless, with a slight yellowish tinge, bright and clear. It has been known to European commerce since 1835, as near as can be definitely ascertained, but has been used undoubtedly by Oriental nations for centuries. It is extensively used in Ceylon, near Singapore, in the Straits settlement, and on the Malabar coast. Ceylon produces the bulk of it, exporting about five million ounces annually, whilst the aggregate supply from other sources amounts to nearly as much.—West. Drugg., July 1888, 243.

Cananga Oil—Identity of Source with Ylang-Ylang Oil.—Messrs. Schimmel & Co. state that the opinion is expressed that the finer sorts of Java cananga oil can be used for all purposes for which the ordinary qualities of ylang-ylang oil suffice, since both oils are derived from the same plant, and the extraordinary differences in quality are due to the more or less perfect methods of preparation.—Pharm. Jour. and Trans., April 6, 1889, 804; from Berichte, April 1889.

Rosin—Liability of the Powder to Spontaneous Combustion.—Dr. H. Hager calls attention to the liability to spontaneous combustion of this article. In the case mentioned sufficient heat had been generated to cause the greater part of the powder to reform a solid mass, although the temperature of the room was only 18°–19° C.

A. Reinhardt records a similar case. It is advisable to keep the powder in tin boxes with tight-fitting covers, so as to prevent as much as possible contact with the air, oxidation being the cause of the rise in temperature.—Amer. Jour. Pharm., Sept. 1888, 455; from Pharm. Ztg., 1888, 420–437.

Colophonium—Detection in Soaps.—Th. Morawski observes that a solution of colophonium in glacial acetic acid, on addition of a drop of concentrated sulphuric acid, assumes an intense red to blue-violet color, soon changing to yellowish brown, having decided fluorescence. In the examination of soaps, the separated fatty acids are dissolved in glacial acetic acid by application of heat, allowed to cool, and then the sulphuric acid (sp. gr. 1.53) added. Serviceable for the detection of rosin in beeswax.—Amer. Jour. Pharm., Dec. 1888, 611; from Chem. Rpt., 1888, 270.

Damar Resin—Constituents.—B. Graf has made a comprehensive series of experiments upon the composition of damar resin, which he finds to contain: 1 per cent. of a dibasic acid, formula $C_{18}H_{32}O_3$; 40 per cent. insoluble in alcohol, which is not a hydrocarbon as has been announced, but which still contains some 2 per cent. oxygen, melts at 140°–145°; and about 60 per cent. soluble in alcohol of formula $C_{20}H_{42}O_2$, containing one alcoholic hydroxyl group, does not possess acid properties, melts at

61°.—Amer. Jour. Pharm., April 1889, 176; from Arch. d. Pharm., Feb. 1889, 97–111.

Two Resins Used by the Ancient Egyptians.—E. M. Holmes has examined two resins found among Egyptian ruins. The one, contained in a jar and in a good state of preservation, was found among the ruins of Naucratis, and dates from the sixth century B. C. It possesses all the characters of *Chian Turpentine.* The other was found on a mummy cloth from the Hawara Cemetery (Lower Egypt). Its characters are such as to lead the author to believe it to be *Siam Benzoin,* notwithstanding that the authors of "Pharmacographia" state that there is no evidence that benzoin was known. He suggests that Siam benzoin may have been the Indian frankincense described by Dioscorides.—Pharm. Jour. and Trans., Nov. 17, 1888, 388–389.

Resins and Gums—Chemical Examination.—Rowland Williams has examined a large number of gums and resins, determining the total potash absorption, the percentage of potash required to neutralize the "free acid," the iodine absorption, ash, and loss on drying at 212° F. The total amount of potash absorbed was found by boiling a weighed quantity of the powdered resin with an excess of semi-normal alcoholic potash for half an hour, adding a few drops of phenolphthalein solution, and titrating back with semi-normal hydrochloric acid. The acidity of the resins was determined by boiling weighed quantities of the samples with strong alcohol, and titrating with semi-normal caustic potash after addition of phenolphthalein solution. The iodine absorptions were ascertained in the well-known manner by means of Hübl's reagent. Ash was estimated by ignition in platinum crucibles, and loss on drying at 212° F. by exposing weighed amounts of the samples to the heat of a boiling water-bath until they ceased to lose weight. All the estimations were performed in duplicate, and the means of the figures obtained are given in the accompanying table:

Name of Gum.	Variety.	Percentages.					
		Total Potash absorption.	Saponification equivalent.	Potash required to neutralize free acid.	Iodine absorbed	Loss on drying at 212° F.	Mineral matter.
Amber	Unknown	8.68	646	1.54	62.10	1.05	0.28
Animi	Rough Demerara	7.36	762	2.66	127.88	0.10	0.05
	Fire Zanzibar	7.36	762	1.82	135.25	0.48	0.11
	Unknown	8.75	641	2.52	137.54	0.31	0.07
Arabic	Unknown	8.40	668	0.84	0.51	8.13	0.22
	"	5.67	989	0.28	None.	11.32	2.45
	"	8.97	625	0.22	None.	12.44	2.29
Asphaltum	Syrian	2.37	2367	0.89	54.08	2.24	6.55
Benzoin	Unknown	14.84	378	9.80	76.45	4.66	1.32
Bone Pitch	Unknown	2.50	2244	2.39	66.04	0.44	0.36
Copal	Soft Manilla	18.41	305	13.16	137.79	0.79	0.21
	Borneo Manilla	17.67	318	14.14	138.04	2.24	0.08
	Singapore Manilla	19.41	289	12.88	123.31	2.41	2.06
	Cleaned Sierra Leone	12.90	435	8.40	138.04	0.91	0.07
	Rough Sierra Leone	13.85	405	7.28	133.35	1.04	0.07
	Rough Accra	13.16	426	4.62	121.66	1.48	1.03
	Rough white Angola	13.30	422	5.74	129.66	0.57	0.27
	Fine clean red Angola	13.62	412	6.02	136.90	0.40	0.02
	Unknown	12.22	459	5.74	142.24	0.98	trace.
Damar	Batavia	3.64	1541	2.24	117.67	0.33	0.01
	Unknown	3.11	1804	2.66	142.24	0.85	0.07
	"	4.07	1378	2.10	130.24	0.71	0.03
Dragon's Blood	Unknown	15.34	366	1.12	98.42	9.34	3.58
Elimi	Unknown	2.86	1962	1.57	175.39	3.50	0.04
Gamboge	Unknown	14.78	379	8.06	115.82	3.70	0.48
Kourie	Medium	9.93	565	6.30	151.13	4.63	0.12
	Fine	7.74	725	5.18	164.21	3.69	0.08
Mastic	Unknown	7.34	764	5.04	158.62	0.97	0.20
	"	7.91	709	5.60	159.00	1.46	0.14
Rosin	Refined, 1st sample.	18.74	298	17.92	115.31	0.13	0.05
	" 2d "	19.57	286	17.78	114.80	0.14	0.02
	Ordinary 1st "	17.64	318	16.94	112.01	0.32	0.08
	" 2d "	19.01	294	16.66	113.28	0.34	1.20
Sandarac	Unknown	15.54	361	15.40	*	1.88	0.04
	"	15.70	357	14.56	134.30	1.44	0.17
Senegal	Unknown	10.42	538	0.28	5.59	23.70	2.59
Shellac	Medium Button	20.33	276	6.30	24.62	1.06	0.28
	Garnet	21.26	263	5.60	28.70	0.72	0.37
	Fine Orange	20.64	271	6.44	17.52	1.23	0.31
	Good 2d Orange	21.07	266	4.76	20.40	0.88	0.42
	Fair 2d "	21.14	265	5.60	19.81	1.01	0.63
	Inferior 2d "	19.41	289	5.74	19.05	1.41	0.94
Tragacanth	Unknown	11.05	508	0.14	None.	16.86	2.64
	"	11.98	468	0.14	1.16	13.52	2.69

* Owing to an accident there was not enough of this sample left for the iodine absorption test.

The author draws attention to the following interesting points brought out by his above examinations:

Animi.—The figures obtained from the three samples examined are, on the whole, fairly concordant—sufficiently so, at any rate, to indicate the ease with which any attempt at sophistication could be detected by an experienced analyst.

Arabic.—These three samples show a considerable difference in many respects, this being most probably due to the gums being of distinct varieties, but, unfortunately, he was unable to ascertain their exact commercial grades. Again, the gum senegal differed entirely from the gum arabic.

Copal.—It will be noticed that nine samples of gum copal were examined. These may conveniently be divided into two classes: the Manilla, with saponification equivalents lying between 289 and 318, and the remaining six samples, with saponification equivalents varying from 405 to 459. Omitting the last figure (which was obtained from a sample the history of which was unknown), it will be seen that the Sierra Leone, Angola and Accra varieties have saponification equivalents lying between 405 and 435. These remarkably constant results, in conjunction with certain other data, prove the impossibility of successfully adulterating gum copal, when this article is submitted to chemical analysis, and at the same time show the readiness with which the analyst can distinguish the different varieties of copal from each other.

Damar.—These three samples show rather wide discrepancies, but even here the saponification equivalents are so extremely high that the application of Koetstorffer's test alone is sufficient to prove the genuineness or otherwise of a specimen of damar.

Elimi — It will be noticed that this gum has by far the highest saponification equivalent and iodine absorption of any of the samples examined, this again rendering any attempt at adulteration difficult, if not indeed impossible.

Kowrie—The results obtained from the two samples agree moderately well, the slight variance between the respective figures being probably due to the difference in quality of the gums, one being termed "medium," the other "fine."

Mastic—All the figures obtained in the case of the two specimens of mastic are remarkably close, again rendering futile any attempt at fraudulent admixture with inferior gums.

Rosins—Perhaps the most notable feature in connection with the rosins is the increase of "free acid" in the refined samples.

Sandarac—With reference to these samples, the main point of interest is the large amount of "free acid" present, this constituting, in fact, almost the whole of the matter acted upon by caustic potash. This point at once distinguishes sandarac from any other gum which he has examined, and is sufficient to prevent the possibility of fraud.

Shellac—All the samples gave very similar results, the chief point of interest being that "fine orange" absorbed the smallest percentage of iodine, while "garnet" and "button" had considerably higher iodine absorptions than any of the grades of "orange."

Tragacanth—The figures obtained were fairly concordant, the greatest discrepancy being in the percentage of water, the proportion of which is known to vary in different samples to a moderate extent.—Chem. News, Nov. 9, 1888, 224–225.

Refined Tar—Preparation and Characters.—Clement B. Lowe describes a refined tar that has recently been introduced under the name of "Steam Refined Tar." The tar comes in cans, flows quite freely, being less viscous than that formerly on the market, and also of a lighter brown color, not granular, but transparent in small quantities, and soluble in alcohol with but little residue, thus excluding the presence of coal tar in any large amount. The cans sometimes contain considerable water, which the author at first thought might be derived from the steam employed in its purification. But on inquiry he learns that steam was not applied directly, but simply as a source of heat through coils in order to liquefy the crude tar, which comes from North Carolina in barrels; when it reaches the factory it is strained through two sieves of different fineness to remove the pine cones, sticks, dirt, etc., which are always present, owing to the carelessness of manufacture; occasionally a barrel will be half filled with a tarry clay. The tar is received into a wooden vat which contains a coil of steam pipe. After running from 100 to 150 barrels of tar through the sieve, about a barrel of sand, etc., will accumulate at the bottom of the vat and will have to be removed.

Regarding the quality of the refined tar, it has been stated that it did not make as satisfactory an ointment as the tar formerly in the market. However that may be, it is evident from the author's paper that the refined tar is simply the ordinary pine tar from which extraneous matter has been removed as described. The presence of water is due to the fact that the crude tar is exposed to the weather, and no care is taken to remove the water when it is originally placed in barrels. The difference in color, viscosity, etc., is doubtless due to the degree of care taken in its manufacture, slow combustion producing light colored, free-flowing tar, while when the combustion is forced the product is darker and more viscous.—Amer. Jour. Phar., May 1889, 234–235.

ALCOHOLS.

Absolute Alcohol—Preparation on a Small Scale.—To obtain absolute alcohol on a small scale, J. Habermann introduces caustic lime, in small fragments, into a glass tube, about 28″ long and 1½″ to 2″ wide, which is connected, in an upright position, with the distilling flask. The lime is, however, not poured into the tube directly, but is made to fill the space between the walls of the tube and a narrow roll of iron-wire gauze occupying the centre of the tube, the object of which is to permit the passage of alcohol vapors upward, when the lower layers of lime begin to become semi-liquid. To completely dehydrate 4 c.c. of 95 per cent.

alcohol, 1 gram of lime is required. At first the contents of the flask must be heated very slowly and gently on a water-bath, so that but little distils over during the first two hours. Then the receiver is changed, and the distillation is made to proceed more rapidly. As soon as the lime has become semi-liquid, the tube is exchanged for another.—Amer. Drugg., Sept. 1888, 169; from Chem. Centralbl., 1888, No. 24.

Alcohol—New Process of Estimation.—According to B. Roese, if potassic permanganate is added to alcohol, mixed with dilute sulphuric acid, an imperfect oxidation takes place, even if the mixture be heated. If, however, very dilute alcohol is first mixed with large excess of permanganate, and then suddenly with about one-third of its volume of sulphuric acid, the alcohol instantly and completely changes into carbonic anhydride and water. Water may now be added, and the excess of permanganate titrated back with potassic tetraoxalate. From the amount of permanganate decomposed, the alcohol can be readily calculated, 8.244 grams of permanganate being equal to 1 gram of alcohol.—Amer. Drugg., July 1888, 133; from Zeitschr. f. angew. Chem.

Alcohol—Indirect Determination in Beer.—D. Sidersky gives a method of determining the alcohol in beer, based upon the difference of density before and after the expulsion of the alcohol. On expelling the alcohol from beer by boiling until it is reduced to half its volume, and then making it up to its original volume with distilled water, we have a liquid of greater density than the sample of beer. If we call d the density of the beer not boiled and D that of the beer freed from alcohol, the difference, $D-d$, will express the increase of the specific gravity of the beer in consequence of the replacement of a certain volume of alcohol by distilled water. If we execute the same operation with a mixture of water and alcohol containing the same proportion of alcohol as the sample in question, we shall evidently have the same increase of density due to the replacement of the same quantity of alcohol by water. If we take distilled water at 15° as the unit of density and calculate the proportion of alcohol per cent., we have the equation—

$$D-d=1-X,$$

in which X expresses the density of a mixture of water and alcohol of the same proportion as the beer in question. Hence we deduce $X=1+d-D$, and find in Gay Lussac's alcoholometric tables the degrees corresponding to the density X, represented by the value $1+d-D$, D and d having been determined by direct experiment.—Chem. News, Oct. 12, 1888, 184; from Monit. Scient. Quesn., Aug. 1888.

Alcohol—Determination of Impurities.—According to Godefrey, impurities in alcohol may be determined in the following simple manner: 6 c.c. of the alcohol are mixed in an ordinary test-tube with one drop of the purest benzol, and, after solution of this, 6 c.c. of sulphuric acid

are added and the mixture well shaken. In the case of pure alcohol no immediate coloration is produced, but a faint rose color develops after 10 minutes. In the presence of foreign reducing agents, however, *i. e.*, aldehydes, an immediate more or less dark brown color is produced, and this increases in intensity during a short time. The reaction is so sensitive that 1 part of aldehyde is indicated readily in one million parts of alcohol. The method is even applicable quantitatively by colorimetric comparison with alcohol containing known quantities of aldehyde. After determining the absence of aldehyde, the mixture is boiled for a short time, when, in the presence of higher boiling alcohols—the so-called fusel oils—a brown coloration with green fluorescence is produced. With pure alcohol, the mixture only assumes a faint ochre-yellow color. The sensitiveness of the test for fusel oils is only one-tenth that for aldehydes. —Arch. d. Pharm., Aug. 1888, 751–752; from Jour. de Pharm. et de Chim., 1888, xvii, 613.

Ethyl Bromide and Ethylen Bromide—Caution.—In "Therap. Monatsh." it is recorded that a substitution of *ethylen* bromide for *ethyl* bromide has recently occasioned unpleasant, though fortunately not dangerous effects. Attention is therefore drawn to the distinct characters, both chemical and physiological, of the two compounds, the similarity of their titles being likely to lead to confusion. Ethyl bromide being the agent exclusively used as an anæsthetic, it is suggested that it should be designated in prescriptions as "bromic ether," and that under all conditions an abbreviation of the name should be avoided.—Arch. d. Pharm., March 1889, 228–229; from Pharm. Centralh.

Dimolecular Cyanide of Ethyl—Formation and Characters—E. von Meyer obtained dimolecular cyanide of ethyl ($C_6H_{10}N=(C_2H_5.CN)_2$) by adding metallic sodium in small pieces to a solution of cyanide of ethyl in alcohol and decomposing the sodium derivative of cyanide of ethyl that is separated out by means of water, which separates the dimolecular compound as an oily fluid congealing shortly to form a crystalline mass. The polymeric compound, $C_6H_{10}N_2$, melts at 47°–48° C., and may be distilled nearly unchanged; but by heating strongly above the boiling point (258° C.) it is decomposed almost completely into two molecules of cyanide of ethyl.

Dimolecular Cyanide of Methyl ($C_4H_6N_2 = (CH_3.C)N_2$) was obtained by R. Holtzwart in an analogous manner to the above. It is obtained in form of snow-white needles by crystallization from a mixture of ether and ligroin, is easily soluble in ether, in alcohol, and in chloroform, moderately soluble in water, and melts at 52°–53° C.—Arch. d. Pharm., Dec. 1888, 1127; from Jour. f. prakt. Chem., 38, 336 and 343.

Ethyl Fluoride—Some New Properties.—H. Moissan observes that ethyl fluoride can be prepared in a state of purity by the reaction of

ethyl iodide and anhydrous silver fluoride. If heated for several hours to a dull redness in a glass bell it yields a complex mixture of carbides containing mere traces of silicon fluoride. Under the action of a weak induction spark it expands greatly, yielding hydrofluoric acid, a small quantity of acetylene, and especially ethylene, without any deposit of carbon. The action of ethyl fluoride upon animals is different from that of ethyl chloride. It produces at first, not anæsthesia, but excitement quickly followed by death.—Chem. News, Jan. 4, 1889, 11; from Compt. rend., Dec. 17, 1888.

Chloroform—Manufacture from Acetone.—G. Rumpp has invented a process whereby the yield of chloroform is very much greater than by the ordinary method. The process consists substantially in introducing acetone diluted with its own weight or more of water, and contained in a reservoir, through a pipe into a mixture of chlorinated lime and water, contained in a distillatory apparatus. In order that a perfect commingling of the acetone with the chlorine may result, the acetone should be introduced at or near the bottom of the vessel, so that by its lesser specific gravity it may ascend through the watery liquid contained in the still. It has also been found that without previous admixture with water the reaction of the acetone and the chlorine is far less complete, and that the greater yield resulting is substantially due to the application of this principle, which, with other important details, constitute the basis of the patent grant. The distillery apparatus is furnished with a vertical shaft, to which are attached several paddles, which in revolving sets the mass in motion, and thus aids in keeping up the reaction and insuring an even generation of the chloroform. The chloroform by the heat generated in the reaction, is volatilized, and is carried through the condenser into the receiver. At the close of the reaction the heat generated is not sufficient to volatilize the chloroform, and steam is then introduced in the bottom of the apparatus until the temperature of the liquid is raised to a point sufficient to cause the remaining chloroform to distill over. To better control the inflow of the acetone, the reservoir in which it is contained is furnished with a cock and a pump, by which it may be supplied from the vessel on the same level with the still. If the reservoir be placed at a sufficient height above the still, this can equally well be effected by means of a siphon.—Western Drugg., Aug. 1888, 186.

Chloroform—Causes of Alteration and Method of Preservation—Marty has investigated the causes of the alteration of chloroform. His conclusions are: (1) Contact with air and light exercises a decomposing action upon even the purest chloroform. (2) It is always possible to restore, by well-known methods, the purity and activity of decomposed chloroform, but this can only be effected by a loss of substance of about 18 per cent. (3) To keep chloroform for a long time, the best way is to place it in yellow, glass-stoppered bottles, made perfectly clean and dry, these

to hold no more than 500 c.c. of the substance, and to add to the pure chloroform, before putting it away, an amount of pure, absolute, ethylic alcohol equal to a thousandth part of its weight.—Drugg. Circ., Feb. 1889, 29; from Arch. de Med. et de Pharm.

Chloroform—Tests of Quality.—Franz Roessler, commenting upon the recent discussion in European journals respecting the sufficiency of the tests for the purity of chloroform, observes that the purified chloroform of the American market is uniformly of such good character that the tests of the present German Pharmacopœia, as well as the U. S. and Brit. Pharmacopœias, are sufficient. A chloroform that will leave a pure odor after evaporation on filter paper, and that will stand the sulphuric acid test for 12 to 24 hours, is all sufficient; indeed the latter test, if the contact is allowed to remain over the specified time, may lead to the rejection of pure chloroform, since there is danger of decomposition of the chloroform by prolonged action. Furthermore, the author cautions against the use of sulphuric acid, the purity of which has not been previously ascertained. Particles of wax introduced into the sulphuric acid immediately after opening the bottle, may give rise to discoloration. The nitrate of silver test proposed, and the further test with iodide of zinc-starch, the author regards as superfluous. On the other hand, the author regards the description of the quality of commercial chloroform in the U. S. P. insufficient; in fact, he considers it an error that such chloroform should be admitted in the Pharmacopœia, since it may, and doubtless does occur that commercial chloroform is dispensed for inhalation. To such substitution, whether by accident or intent, the author ascribes one of the main causes for the preference by American physicians for ether-anæsthesia to that by chloroform.—Pharm. Rundschau, Feb. 1889, 33–34.

Chloroform—Estimation.—L. de St. Martin recommends a method for the estimation of chloroform which is based upon the observation that a solution of caustic potassa in alcohol of 60 per cent. decomposes chloroform slowly, but almost completely, at the ordinary temperature, and rapidly (and completely? Rep.) at 100° C. If the strength of the potash solution is known, the excess may be determined by titration, using phenolphthalein as indicator, and after the liquid has been carefully cooled, the amount of potassium chloride formed may be estimated by silver nitrate, using potassium chromate as indicator. In the cold solution the alcohol and potassium formate have no effect on the titration. In employing this method the chloroform and alcoholic potash are heated in sealed tubes.—Amer. Drugg., Sept. 1888, 174; from Compt. rend.

Chloral and Chloroform—Resorcin a New Test.—A new test for either chloral or chloroform, which is said to exceed every other in delicacy, has been based by C. Schwarz upon the previously announced color reac-

tion of chloroform with resorcin and potassa. If a solution of resorcin is heated to boiling with chloral hydrate or chloroform, in presence of an excess of caustic soda, a red coloring matter is produced, even if only the least traces of chloral or chloroform are present. This color disappears on supersaturating with acid, and reappears on addition of alkali.

On the other hand, if chloral hydrate (0.1 gm.) or chloroform are heated to a brisk boil with an excess of resorcin (0.3 gm.), and only a little soda solution (3 c.c. of water and 3 drops of 10 per cent. soda solution), a yellowish-red liquid is produced, which shows a magnificent yellowish-green fluorescence even in the greatest dilution. The red coloring matter appears to be rosolate of sodium, while the fluorescence is due to the formation of fluoresceine. The author has obtained this color reaction with as little as 1 c.c. of a solution of 0.1 gm. of chloral hydrate in 1 liter of water, if the following method be adopted: In 1 c.c. of the solution just mentioned, 0.05 gram of resorcin are dissolved, and the whole heated to brisk boiling. Colorless solutions may at once be subjected to the test with resorcin and soda. Colored ones, however, such as red wine, liquorice mixtures, etc., must first be decolorized.—Amer. Drugg., Jan. 1889, 13; from Zeitsch. f. Anal. Chem., 1888, 668.

Choral Cyanhydrin—Characters, etc.—E. Utescher describes chloral cyanhydrin (see Proceedings 1888, 493), which like benzaldehyde-cyanhydrin, has recently been proposed as a substitute for hydrocyanic acid and bitter almond water. Chloral cyanhydrin constitutes white, somewhat hygroscopic crystals, having the peculiar odor of chloral. It contains 15.7 per cent. of hydrocyanic acid, the sample examined by the author containing 95 per cent. of this theoretical quantity. When shaken with water (1:60) it apparently enters into solution, but closer examination makes it evident that the crystals have simply been disintegrated. Complete solution is effected on heating, but the compound is partially decomposed, the solution having the odor and reaction of hydrocyanic acid, which before heating could not be obtained. The compound dissolves in alcohol without being decomposed, and this points out the proper method for dispensing it; solution in alcohol, and dilution of this solution in water. Mr. Utescher, however, does not find that either chloral cyanhydrin or benzaldehyde-cyandrin are necessary or desirable as substitutes for bitter almond water, for which they have been proposed. He advises the addition of more alcohol to render the bitter almond water more stable, and to increase the delicacy of the tests of its quality and composition.—Arch. d. Pharm., Aug. 1888, 713–719.

Chloral Ammonium—Dose, etc.—According to Nestbit, chloral ammonium (see Proceedings 1888, 494), has the odor and taste of chloral, but the taste is less persistent. Used in 1 to 2 gm. doses it gives the therapeutic effects of urethan and chloral, being both hypnotic and analgesic. Its action upon the heart and respiratory centres is less strong than that

of chloral.—Amer. Jour. Pharm., Dec., 1888, 615; from Nouv. Rem., Nov. 8, 1888.

Uralium—A New Hypnotic.—Gustavo Poppi has recently described to the Medico-Chirurgical Society of Bologna the effects of a new hypnotic, produced by the combination of chloral hydrate with urethan. From experiments on animals and on the human subject he concludes that this substance—*uralium*—induces sleep more quickly and more certainly than any other known hypnotic. It causes no bad effects of any kind. It has been given in cases of heart disease and nervous complaints with the best results, even when other hypnotics had failed.—Amer. Drugg., May 1889, 86; from Chem. and Drugg.

Paraldehyde—Danger Attending its Use.—According to Dr. Froehner, paraldehyde is by no means so innocent a hypnotic as it has been frequently reported. On the contrary, it should be used with great care. In animals living chiefly upon vegetable diet, it attacks particularly the red blood-corpuscles. Under its reducing action, the blood becomes as seriously affected (by methæmoglobin-anæmia) as by chlorate of potassium, pyrogallic acid, or nitrobenzol. In addition, it has a poisonous effect upon the nervous centres.—Amer. Drugg., Oct. 1888, 197; from Rundschau (Prag.)

Sulfonal—Avoidance of Disagreeable Odor in its Manufacture.—The preparation of sulfonal has hitherto involved the formation of ethyl mercaptan by distillation of ethyl-sulphuric acid and potassium sulphhydrate, condensing this with acetone to form mercaptol, which in oxidation with potassium permanganate yields sulfonal. The manufacture is accompanied by such disagreeable odor that factories had to be erected distant from inhabitation. A process has now been determined which admits of its manufacture without the isolation of mercaptan and consequent odor; ethyl chloride or bromide acting upon sodium thiosulphate forms sodium ethyl-thiosulphate which when treated with HCl by addition of H_2O splits into ethyl mercaptan and acid sodium sulphate; the ethyl mercaptan in the nascent state and presence of HCl condenses with acetone to form mercaptol (yield about 70 per cent.) which by dilution with water is separated, then removed and oxidized by $K_2Mn_2O_8$.—Am. Jour. Phar., April 1889, 178; from Pharm. Ztg., 1889, 98.

Sulfonal—Standard of Purity Adopted by the Manufacturers.—The four German manufacturers of sulfonal have agreed to the following tests of purity of the sulfonal manufactured by them: The product must be perfectly white, absolutely inodorous, must be free from pronounced bitter taste, must melt at 125.5°, with a limit of 0.2° either way, and a watery solution saturated at 15° must remain unchanged for one hour when mixed with a $\frac{1}{10}$ per cent. aqueous solution of permanganate. The test of taste is conducted twice in the course of an hour, the first time the

typical sample and then the sample under examination being tasted, while the second time the sample is tasted first and the type afterwards. The test of odor is best made by boiling 0.5 to 1 gram of the sulfonal with about 10 grams of water in a test tube; the slightest odor adhering to the sample would thus become evidenced (the mercaptol odor) in the water vapors thus developed.—Arch. d. Pharm., Jan. 1889, 33–34; from Pharm. Centralh., 29, 614.

Sulphonal—Test for its Presence.—According to G. Vulpius, if equal quantities of sulphonal and potassium cyanide are triturated together, and the mixture is heated in a dry test tube, dense vapors are quickly given off having the odor of mercaptan. If the melted mass is dissolved in hot water, the solution produces a blood-red color, identical with the reaction between sulpho-cyanide of potassium and ferric salts.—Apoth. Ztg., 1888, 247.

Sulphonal—Doses.—As the result of a long study of sulphonal, Egasse gives the doses as follows: For children, 15 to 25 cgm., two hours before bed time; for women, 1 to 2 gm.; and for men, 2 to 5 gm., daily, either fractionally, or, as seems preferable, in massive doses, given during a meal, or two hours before the hour for sleep. It is best given, finely pulverized, in capsules, but may be held for some time in suspension in dense mucilaginous mixtures. It may also be given in wine or milk.—Amer. Jour. Pharm., May 1889, 243; from Bull. gén. de. Therap., March 15, 1889.

Iodoform—Manufacture from Kelp-ash direct.—H. Suilliot and H. Raynaud give the following formula for the preparation of iodoform:

To a solution of 50 p. iodide of potassium, 6 p. acetone and 2 p. caustic soda in 1 to 2,000 parts of water, a dilute solution of hypochloride of sodium is added by drops until iodoform ceases to be produced. The yield corresponds approximately to the calculated quantity, according to the following equation: $KI+KClO=KIO+KCl.—(CH_3)_2CO+3KIO=CHI_3+C_2H_3KO_2+2KOH$. The authors have used this method during the past six months for the industrial preparation of iodoform direct from kelp-ash. The ash is lixiviated, and the sulphides and sulphites that enter into solution are removed; the iodine is then determined, and the calculated quantities of the other ingredients are added and used as in the above method.—Arch. d. Pharm., May 1889, 475–476; from Bull. Soc. Chim., 1889, No. 1, 3.

Iodoform—Determination.—M. Greshoff has found that iodoform reacts with silver nitrate according to the following equation: $CHI_3+3AgNO_3+H_2O=3AgI+3HNO_3+CO$. The reaction serves for the estimation of iodoform in medicaments. A small quantity of the preparation—for instance a salve—containing possibly 0.1 to 0.5 grams of iodoform, is melted on the water bath with addition of 10 grams of a 10 per cent.

solution of silver nitrate. The fatty body is removed, after cooling, by shaking repeatedly with ether, the residue is diluted with twice its volume of warm water, and the silver iodide collected on a filter, washed, dried and weighed. If the determination is to be made in bandages, these are extracted with ether, the ethereal solution is treated with the silver solution, and the iodide of silver separated and determined as in the previous case. The results are exceedingly accurate.—Arch. d. Pharm., Dec. 1888, 1128; from Nieuw. Tijdschr. Pharm. Nederl., 1888, 349.

Iodoform—Impurities.—C. Neuss has found certain brands of iodoform, among them a few which are reputed to be the purest, to yield with 10 parts of ether immediately a red solution, while other brands furnished a yellow solution retaining its tint for at least 10 minutes. In all other respects, the former responded to the requirements of the Germ. Pharmacopœia. The samples which produced the red solution were also found to impart to pure gauze (free from chlorine) at once a green color, even when light was excluded. Curiously enough, this green color returned again to normal yellow when the gauze was kept in the dark for some days or weeks. Iodoform which behaves as above stated, exercises a caustic effect upon the skin. A person who manufactured prepared gauze with this kind of iodoform, suffered from eczema for several days. It is not impossible that the secondary effects of the drug reported by numerous observers are due to the same impurity as that which causes the above-mentioned color reactions. The quality of ether used for the first experiment has only a slight influence upon the reaction, since chemically pure ether can retard it only for 1 or 2 minutes.

The chemical nature of the secondary body which yields up its iodine so readily has not yet been made out. That the iodine must be originally in combination is shown by the fact that alcohol fails to remove it from the iodoform, while the red ethereal solution undoubtedly contains free iodine. The author is convinced that neither free iodine nor hydriodic acid are present previous to the solution in ether, also that the secondary body is more easily soluble in ether than iodoform itself.—Amer. Drugg., Nov. 1888, 207; from Pharm. Centralh., No. 39.

Iodoform—Decomposition of its Solutions.—It is stated in "Jour. de Méd. de Bordeaux" that ethereal solutions of iodoform become very unstable as they approach saturation. In solutions of alcoholized ether, decomposition is retarded, but it occurs—setting free iodine—even when the solution is kept from the action of light. The altered solution may be agitated with a globule of mercury which unites with the free iodine, and the ethereal solution, no longer saturated, becomes more stable. Chloroformic solutions act in the same way.—Amer. Jour. Pharm., June 1889, 288; from Rép. de Pharm., May 10, 1889.

Iodoform—Stability of Solutions.—B. Fischer in studying the action of

solvents upon iodoform finds that, if pure iodoform be dissolved in solvents free from dissolved air and without access of air, the solution will keep of a light yellow color so long as air be excluded; if air be admitted decomposition takes place in a few minutes, attended by liberation of iodine. The presence of certain substances retards this decomposition; these substances (impurities) may be present in the solvents from which iodoform is recrystallized, thus contaminating the crystals, or they may be present in the solvents; such substances as retard the change, if present in minute quantity, are hydroquinone, pyrogallic acid, aniline, pyridine bases and aldehyde.—Pharm. Ztg., 1889, 31.

Iodoform—Value and Use as a Hæmostatic.—Drs. Chauvin and Jorissene report great success with iodoform in hemorrhages from the lungs and other serious hæmoptyses; relapses were rare and of lessened severity; it succeeded where ergotin was inert. In a majority of cases the iodoform was associated with tannin in small doses, but the authors regard iodoform as the active agent. The formulæ used are as follows: 1. Iodoform, 5 cgm., ext. gentian, or quinine, q. s. for one pill. 2. Iodoform, 5 cgm., tannin, 10 cgm., any suitable excipient, for one pill. Dose, 3 to 5 pills daily. In six months of successful treatment it was rarely necessary to give more than 8 or 9 pills daily.—Amer. Jour. Pharm., Nov. 1888, 563; from Revue Méd.; Monit. Thérap., Oct. 1, 1888.

Iodoform—Poisoning of Children.—Dr. Cazin reports two cases of children who had toxic symptoms after application of iodoform dressings following surgical operations. In one of them "the symptoms took a comatose and in the other a meningitic form." After a modification of the dressings the symptoms disappeared. Dr. Cazin thinks that iodoform should be used with the greatest caution in dressing open wounds of children.—Amer. Jour. Pharm., June 1889, 289; from Répert. de Phar., April 10, 1889.

Iodoformium bituminosum—A New Medicament.—According to "Rundschau" (1888, 640), the new remedial agent introduced under the name of "iodoformium bituminosum" is made by incorporating iodoform with tar in such a manner that an almost odorless preparation results; the process remains a secret. In larger quantities the odor of tar is perceptible; if the preparation is mixed with a large quantity of water the iodoform odor becomes prominent.

Methylic Alcohol—Detection in Ethylic Alcohol.—J. Habermann describes a process for the detection of methyl in ethyl alcohol, which is a modification of the Cazeneuve–Cotton permanganate process. In order to eliminate from commercial alcohol or brandy certain impurities which, though not identical with methylic alcohol, have a similar reducing action, Habermann shakes up 30 to 40 c.c. of the sample with 20 c.c. of the purest olive oil in a parting-funnel. The shaking must not be vio-

lent, but protracted. It is then let stand quietly until the fatty oil has separated from the alcoholic-aqueous liquid. The oil is poured off, and the alcoholic aqueous liquid, with 20 c.c. more oil, are again put in the funnel, and the process of shaking and separation is repeated, as above, and the alcohol freed from the oil is then passed through a double filter, well wetted. The clear filtrate has no smell of an ethereal oil, and, if no sugar is present, it can be at once examined for methylic alcohol by the process of Cazeneuve and Cotton. If sugar is present it is got rid of by means of distillation, the distillate being taken for examination.—Chem. News, Nov. 23, 1888, 256; from Zeitschr. f. Analyt. Chem., xxvii, Part 5.

Methyl Alcohol—Determination of Acetone.—J. Messinger proposes a method for the determination of the acetone in methyl alcohol, which is based upon the following reactions: By the addition of an excess of standard iodine solution in presence of potassium hydrate the acetone is converted into idoform; the excess of iodine is present as iodide and hypoiodite of potassium, which react, on acidifying with hydrochloric acid, with each other to liberate iodine, which is then titrated with standard sodium hyposulphite. Every 759.6 parts iodine used represent 58 parts acetone.—Am. Jour. Pharm., Feb. 1889, 76; from Ber. d. D. Chem. Ges., 1888, 3366.

Amylic Alcohol—Removal of Furfurol.—Dr. L. v. Udransky, after various experiments to obtain pure amylic alcohol, and particularly to remove *furfurol*, the most objectionable impurity, finds that the latter is best removed in the following manner:

Prepare amylosulphate (sulphamylate) of potassium in the same manner as sulphethylates (sulphovinates) are obtained. Dissolve the salt in a small quantity of warm, pure alcohol, and precipitate it with a large excess of pure ether. It is thus obtained in form of crystalline laminæ. Repeat this process three or four times. Then place the salt into a flask, cover it with a 10 per cent. sulphuric acid, and heat under an upright condenser during five hours on a steam bath. Remove the separated amylic alcohol, shake it with calcium carbonate, separate it again, and distil it with steam. Amylic alcohol thus prepared is perfectly free from furfurol. The latter would be readily detected by adding a little of it to concentrated sulphuric acid containing alpha-naphthol in solution, which assumes a more or less colored (red) tint if furfurol is present. While ordinary amylic alcohol, when shaken with cold and concentrated, or hot and diluted solution of soda, acquires a tint itself and causes the alkali solution to become likewise colored, no such coloration is produced if the purified alcohol is employed. If the latter is free from furfurol, it may be boiled for any length of time with concentrated solution of soda without showing any change of color. It may also be left in contact with acids, and exposed to the light.—Amer. Drugg., April 1889, 70; from Zeitsch. f. Phys. Chem., xiii, 248.

Fusel Oil—Detection in Spirits.—Uffelmann determines fusel oil in spirits by the following method: He pours 250 c.c. of the spirit into a ¾ litre flask, adds 100 c.c. of ether, shakes up well, adds sufficient water to separate the ether, draws off the ethereal liquid, shakes up afresh with 100 c.c. ether, unites the ethereal extracts, lets evaporate, dissolves the residue in 40 c.c. ether, adds a few c.c. of fresh green solution of methyl violet (dissolve 1 part methyl violet in 100 water and add hydrochloric acid at 2 per cent. until the liquid turns green), shakes, and pours into a graduated tube, 2.5 c.m. in diameter. The ether evaporates. As soon as a blue color is perceived and the first indication of the methyl-violet absorption at D is detected with the spectroscope, he reads off the quantity of ether still remaining. Each 10 c.c. of the liquid contain 0.2 c.c. amylic alcohol, which occasions the blue color.—Chem. News, Aug. 3, 1888, 60; from Zeitsch. f. Analyt. Chem., xxvii, part 1.

Amyl Nitrite—A Mixture of Metameric Nitrites.—Professor Dunstan and W. Lloyd Williams observe that the liquid which has hitherto been known to scientific chemists as pure amyl nitrite is a mixture of metameric nitrites, corresponding to α-amyl alcohol or iso-butyl carbinol ($CH(CH_3)_2CH_2CH_2NO_2$) and β amyl alcohol or secondary butyl carbinol ($CH(C_2H_5)CH_3CH_2NO_2$). The relative proportions of these two nitrites in the mixture are dependent on the composition of the "amyl alcohol" from which they have been prepared. The respective quantities of these two metameric alcohols contained in different specimens of fusel oil are subject to variation. The quantity of the α-amyl alcohol, which is optically inactive, is always much larger than that of β-amyl alcohol, which is lævorotatory. In the portion of fusel oil which has been repeatedly fractionated between 127°–132°, there is said to be usually about 13 per cent. of the active alcohol. These alcohols cannot be separated by fractional distillation, since the α-amyl alcohol boils at 128° C. and the β-amyl alcohol at 131° C. Their separation is a matter of very great difficulty, and it has seldom been accomplished. In order to separate the two metameric nitrites, it was necessary first to obtain the corresponding alcohols. The separation of the two alcohols was first effected by Pasteur (Compt. Rend., xli., 296), by converting them into two barium amyl-sulphates, and repeatedly recrystallizing these salts from water, by which means it is possible to obtain the pure salt corresponding to the inactive alcohol, and after several further series of recrystallizations of the residual salts, that corresponding to the active alcohol; the barium salt of β-amyl-sulphuric acid being about two and a half times more soluble than the barium salt of α-amyl-sulphuric acid. This process of isolation is very laborious, and was accomplished by the author as follows:

Fusel oil, which had been distilled with steam, was dried and fractionated. The fraction obtained between 127°–132°, after having been several times redistilled, exercised a rotation of —1° (for the D ray), in a

tube 200 mm. long, at 15° C., the determination being made in Laurent's instrument. If we take —8.8° (Ley) as the rotatory power of the active alcohol under the same conditions, then this liquid was constituted of 88.64 per cent. of α-amyl alcohol and 11.36 per cent. of β-amyl alcohol. About 1½ litre was warmed for one week with an equal weight of sulphuric acid, the mixture was largely diluted with water, neutralized with barium carbonate, and filtered. The solution was concentrated and fractionally crystallized, the fractions, which were early obtained, were isolated and separately recrystallized about twenty-three times. From some of the salt thus purified the alcohol was regenerated, dried and distilled. It boiled at 129°–130° C., and at 15° C. its specific gravity was .813. The liquid was found still to possess rotatory power. At 15° C. in a tube 200 mm. long the rotation was observed to be —0.45°, so that the repeated recrystallization of the barium salts had only removed two-thirds of the active alcohol which the liquid originally contained. The regenerated liquid still contained 5.1 per cent. of the active alcohol. Since a comparison of the physiological effects of several specimens of α-amyl nitrite, associated with different amounts of β amyl nitrite, with the physiological effect of pure α-amyl nitrite, would enable the action of β-amyl nitrite to be inferred, the above-mentioned alcohols were converted into the nitrites, and their action is being physiologically examined by Professor Cash. The nitrites boiled at 96°–97°, and the specific gravity of the liquid was 0.874 at 15° (water at 15°=1).

The remainder of the barium salts was now dissolved in a large quantity of water, and the dilute solution allowed to crystallize slowly. The salt obtained was separated from the mother-liquid and again recrystallized twelve times. The barium salt had now been recrystallized thirty-five times. On regenerating the alcohol and drying it, the boiling point was found to be 131° C. (bar. 759 mm.), the whole of the thermometric column being immersed in the vapor. The specific gravity of the liquid at 15° C. was 0.8140 (water at 15°=1). The alcohol was now practically inactive, the rotation effected in a column 200 mm. long being only one-tenth of a degree. The nitrite was now prepared from this alcohol by the method which has been previously described, and its characters have been carefully examined. It was shown to be pure by the method which has already been alluded to. (Weight of liquid taken, 0.1787 gram; pure amyl nitrite found, 0.1797 gram). The boiling point, determined with a standard thermometer, is 97° C. (bar. 758.5 mm.) Its specific gravity at 15° is 0.880 (water at 15°=1). The liquid was virtually inactive, showing a dextro-rotation in a tube 200 mm. long of only one-twentieth of a degree. α-amyl nitrite is a pale yellow liquid having a not disagreeable odor, and producing when inhaled the characteristic nitrite effect. Its physiological action is being investigated by Professor Cash. The authors have, furthermore, subjected the

Amyl Nitrite Used in Medicine to examination.—Two samples, designated as officinal (B. P.) by reputable manufacturers were subjected to fractional distillation. The first of these was fractioned five times, and two fractions were finally obtained that boiled at 67° and 96° respectively. The specific gravity of the liquid boiling at 67° was ascertained to be 0.8755 at 15° (water at 15°=1). The nitrite was estimated in the compound, and it was found to correspond almost exactly with that contained in iso-butyl nitrite (0.1756 gram of liquid yielded an amount of nitric oxide corresponding to 0.1746 gram $C_4H_9NO_2$). The physical and chemical properties of the liquid were thus shown to be identical with those of pure iso-butyl nitrite. This compound constituted about 10 per cent. of the original "amyl nitrite." The liquid which boiled nearly constantly at 96° was next examined. Its specific gravity was 0.878 at 15° (water at 15°=1). The amount of nitrite contained in it was almost the same as that contained in amyl nitrite (0.211 gram yielded an amount of nitric oxide corresponding to 0.2099 gram of $C_5H_{11}NO_2$). This liquid was evidently a mixture of α-amyl nitrite (b. p. 97°) and β-amyl nitrite (b. p. 94° circa). The presence of the β amyl nitrite was proved by the dextro-rotation exercised by the liquid. The quantity of the amyl nitrites contained in the original substance was about 50 per cent. The second sample was evidently prepared from imperfectly rectified fusel oil. It contained some nitrite of ethyl, and altogether but 40 per cent. of nitrites of amyl. It also contained unaltered amyl and other homologous alcohols.—Pharm. Jour. and Trans., Dec. 22, 1888, 485–490.

Tertian Nitrite of Amyl—Physiological Properties.—Bals and Broglio describe tertian nitrite of amyl ($C_5H_{11}NO_2$) as possessing the physiological and therapeutic properties of the primal nitrite, but without giving rise to the well-known toxic symptoms of the latter. The authors state also that its action is more strongly marked and of longer continuance, and that it does not produce the sensation of heat and tension in the face or throbbing in the temples usually caused by the nitrite now in use. It may be inhaled in quantities of 80 to 100 drops a day without danger or inconvenience, even in cases of weak heart. It has a slight hypnotic action, usually producing a half hour's calm sleep after each inhalation. —Amer. Jour. Pharm., Aug. 1888, 406; from Gior. della Acad. di Med. di Torino; Nouv. Rem., June 8, 1888.

Amylene Hydrate—Characters and Tests of Purity.—The Pharmacopœia Commission of the German Apothecaries' Society gives the following characters and tests of purity of amylene hydrate. Clear, colorless, volatile liquid having a peculiar, spicy-ethereal odor, burning taste, neutral reaction; soluble in 8 parts of water, miscible with alcohol, ether, chloroform, benzin, glycerin, and fixed oils to clear solutions; boiling at 95° to 103°; sp. gr. 0.815 to 0.820. 20 c.c. of the aqueous solution (1 = 20) to which 2 drops solution of permanganate of potassium have

been added, should not become decolorized within 10 minutes. When heated for 10 minutes with ammoniacal silver solution, the aqueous solution (1 = 20) must not exert a reducing action. Amylen hydrate should be preserved carefully and protected from light.—Arch. d. Pharm., July 1888, 645.

Amylene Hydrate—Hypnotic Action.—Dr. Lares presents the following conclusions on the results of his experience with amylene hydrate:

1. Amylene hydrate is a very useful hypnotic, which may be given in two or three times as large a dose as chloral hydrate.

2. It operates somewhat less certainly than chloral hydrate and morphine.

3. Unpleasant accidents (excitement, slight drunken-like stupor) were very seldom observed. Grave accidents were never observed.

4. A tolerance, relative to diminution in efficiency, was not noticed within three months.

5. The deep and refreshing nature of the sleep obtained was praised oftener than in the case of any other sleep-producing means.—Amer. Jour. Pharm., Nov. 1888, 584; from Berl. Klin. Woch.

Carbolic Acid—Effect of Low Temperature on its Solutions.—E. Houssaye observes that 5 per cent. solutions of carbolic acid become turbid when exposed to a temperature of $+4°$, and even when containing 10 per cent. of alcohol, the solution becomes turbid at $+2°$. The addition of 5 per cent. glycerin, however, prevents the turbidity even on freezing.—Arch. d. Phar., May 1889, 475; from Jour. de Phar. et de Chim., 1889, xix, 236.

Carbolic Acid—Use as a Cure for Corns.—Gubler states that carbolic acid is a much more powerful escharotic than creasote, and that, in a concentrated state, it has the effect of tanning and corroding the skin. Dr. Salemi, of Nice, has taken advantage of this property for the purpose of curing a corn which several other remedies had failed to remove. He gives the following directions: After bathing the feet in soapy water, dry the affected part. Melt the carbolic crystals by a gentle heat, and apply a thickish layer over the softened surface of the corn, taking care not to touch the surrounding sound skin. After a few minutes, apply to the layer of acid a piece of wadding, or blotting paper, to absorb the excess of the acid. Before applying the acid surround the corn with a stout layer of collodion. Repeated at intervals of three or four days, this simple remedy is stated to effect a complete cure.—Amer. Drugg., Feb. 1889, 27; from Chem. and Drugg.

Carbolic Acid—Use for the Removal of Warts.—Prof. B. Frankel in the *Wiener Medizinische Presse*, Oct. 1888, recommends the following method for the removal of warts: The skin surrounding the wart should be covered with cotton, and thus protected. Then, by means of a glass

rod, apply the liquid carbolic acid to the wart and allow it to dry. No pain is perceptible. In the course of two or three days a part of the wart will fall off. Renew the application until all has been removed.—Med. News, Dec. 1.

Sulpho-carbolates—Preparation and Characters.—Prof. F. B. Power and Edward G. Raeuber have made comprehensive experiments to determine the chemical constitution and method of preparation of the officinal sulpho-carbolates. The sulpho-carbolates seem to have been introduced into medicine about the year 1868, but none were included in the U. S. Pharm. until 1880, when the sodium and zinc salts were adopted. In view of the fact that three isomeric sulpho-carbolic acids are known to exist, viz.: *ortho*, *meta*, and *para sulpho-carbolic* acid, that the Pharmacopœia does not give a method for the preparation of the sulpho-carbolates, and that confusing statements exist in the text-books respecting the constitution of the officinal salts, the *ortho*-salt being assumed by one, the *para*-salt by the other, the experiments made by the authors seemed necessary. The *meta* salt is excluded from consideration, since the *meta*-acid is formed only by special treatment, whereas the *ortho* and *para* acids are obtained by the direct action of sulphuric acid upon carbolic acid, the former without heat, the latter under the influence of heat. From the results of their investigation the authors draw the following practical conclusions:

1. The sulphocarbolates of the Pharmacopœias, as also those supplied by the manufacturing chemists, are the *para* and not the *ortho* compounds. They should therefore be prepared by digesting the mixture of phenol and sulphuric acid at the temperature of a water-bath for about six hours, instead of limiting the temperature to about 55° or 60° C., for several days, as directed in the Dispensatories. At the latter temperature mixtures of *ortho* and *para* compounds are obtained.

2. The chemical formula and the description of *sodium sulphocarbolate*, as given in the U. S. Pharmacopœia, pertain to the *para* compound, and are correctly expressed, with the following exceptions: The crystals are not absolutely "permanent in the air," but effloresce slightly on exposure. The solubility is more exactly 1 part in 4.8 parts of water, instead of 5 parts, but the latter statement is sufficiently correct for practical purposes. The amount of residue left by the ignition of the sodium salt is not "36 per cent.," but 30.6 per cent.

3. The difference in the solubilities of the *ortho* and *para* sodium and zinc sulphocarbolates in water is not very great.—Pharm. Rundschau, May 1889, 103–110.

Camphorated Phenols—Composition, etc.—The liquefying influence of camphor upon naphthol (see camphorated naphthol) observed by Désesquelle, has prompted Audoncet to experiment in the same direction upon other phenols with the following results, the quantities of camphor cited

representing the amounts strictly necessary to reduce the preparations to the condition of a soft paste: Resorcin, 2.50 gm., camphor, 5 cgm.; pyrogallol, 2.50 gm., camphor, 10 cgm.; thymol, 5 gm., camphor, 1 gm.; salol, 5 gm., camphor, 50 cgm. An increased amount of camphor gives syrupy liquids miscible in all proportions with oils, lard and petrolatum, and which are soluble in alcohol and ether, and insoluble in water. Similar results were obtained with menthol.—Amer. Jour. Phar., March 1889, 136; from Répert. de Phar., Jan. 10, 1889.

Phenolate of Mercury—Preparation.—Hugo Andres observes that phenolate of mercury of the market is quite variable in composition, and proposes a method by which a definite product is uniformly obtained. It is necessary first to prepare

Phenolate of Potassium by dissolving in alcohol of 90 per cent., 94 parts of crystallized phenol and 56 parts of hydrated potash. Evaporate to a syrupy consistency in the water-bath, and place under a bell-glass with sulphuric acid until desiccation is effected. Then dissolve 100 parts of phenate of potassium in alcohol, filter, and precipitate the filtrate with an alcoholic solution of 112 parts of corrosive sublimate; an orange precipitate is thus obtained, which should first be washed with alcohol of 60 per cent., and then with absolute alcohol, until the filtrate gives no precipitate with sulphuretted hydrogen. The dried product is an amorphous powder of a brick-red color with a faint odor of phenol. It is insoluble in water, chloroform, sulphide of carbon, ether and alcohol. With heat it dissolves easily in hydrochloric acid; with potash, the solution gives a precipitate of yellow oxide of mercury. It is also dissolved by nitric acid. The preparation contains 51.68 per cent. of mercury; theoretically it should have 51.81 per cent.—Amer. Jour. Pharm., March 1889, 135; from J. de Phar. et d. Chim., through Bull. Com., January 1889.

Betol—Characters and Relations to Salol.—Betol has recently been highly recommended by Robert as a substitute for salol in rheumatism and other affections. The two agents are closely related, both being derivatives of salicylic acid, salol being regarded as salicyl-phenylic ether, while betol may be regarded as salicyl-napththylic ether. Betol constitutes pure white, shining crystals, is odorless and tasteless, melts at 95°, and is insoluble in cold or hot water, with difficulty soluble in cold alcohol, but readily dissolved by hot alcohol (1:3), in ether and in benzol. It is not decomposed by acids or alkalies in the cold, but the alkaline pancreatic fluid has the power to decompose it—as it does salol—and it is this reaction that renders the two substances valuable as remedies in intestinal affections. While, however, salol is by this reaction split up so as to form phenol—which is highly poisonous—betol splits up, so as to form naphthol, which is non-poisonous and equally effective in the treatment of intestinal troubles.—Arch. d. Pharm., Aug. 1888, 703–704; from Pharm. Centralh., 1888, 319.

Creolin—Composition.—Th. Weyd gives analyses of the two brands of creolin found in the market at the present time; it will be seen that they only have the name in common. Pearson's article is quite soluble in ether, which is a simple distinctive test.

	Pearson's.	Artmann's.
Hydrocarbons	56.9	84.9
Phenols	22.6	3.4
Acids	0 4	1.5
Sodium	2.4	0.8

—Amer. Jour. Phar., April, 1889, 176; from Ber. d. D. Chem. Ges., 1889, 138.

Creolin—Composition, Cause of Emulsifying Property, etc.—According to B. Fischer, creoline (see Proceedings 1888), contains hydrocarbons, 66; phenols, 27.4; organic bases, 2.2; ash, 4.4, composed of Na_2SO_4, NaCl and Na_2CO_3. It is made by freeing that portion of coal-tar boiling between 180 and 220° from carbolic acid. According to R. Otto, the property of emulsifying with water is probably due to the presence of small quantities of phenol sulphonates and pyridine sulphonates.—Phar. Centralhalle, 1888, 467.

Creolin—Characters, etc.—According to a thorough examination by Otto and Beckurts, Jeye's creolin contains hydrocarbons (boiling point, 190–359°), 59.6; phenols (boiling point, 200–310°), 10.4; pyridine bases, 0.8; abietic acid, 23; soda, 2.8; water, 3.4. The miscibility of this creolin with water is due to the presence of the resin soap; that there must be other substances producing the same results is evident from the fact that Artmann's creolin is free from resin or fat soap, and still possesses this property.—Pharm. Centralhalle, 1889, 227.

Creolin-iodoform—Superiority as an Antiseptic.—Creolin-iodoform, a mixture of iodoform with one or two per cent. creolin, is considered by Dr. Jaksch to be the best antiseptic and deodorized preparation of iodoform yet offered. It is of faint aromatic odor, soluble in alcohol and ether; water removes the creolin, leaving the iodoform.—Pharm. Post, 1888, 630. See also "Creolin."

Creasote—Tests of Purity and Identity.—W. Brandes communicates the following tests for establishing the purity and identity of creasote: (1) Specific gravity 1.070–1.080 (xylenol and phlorol have specific gravity 1.036; guaiacol, 1.117; creasol, 1.089); (2) the presence of guaiacol and creasol, indicated by formation of potassium salts insoluble in alcohol, is ascertained approximately quantitatively by thoroughly shaking 1 c.c. creasote and 10 c. c. of a solution containing 50 gms. potassium hydrate dissolved in 200 c.c. 96 per cent. alcohol; the test after a short time should yield a solid mass not disturbed by brisk agitation; (3) 4 c.c. water, 4 c.c. sodium hydrate solution, and 2 c.c. creasote, should produce a per-

fectly clear light-yellow solution, a turbidity indicating indifferent oils, a darkening other constituents of the wood-tar; (4) the glycerin test for carbolic acid.—Arch. d. Pharm., Feb. 1889, 111–115.

Cresylic Acid—Superiority as an Antiseptic over Phenol.—According to the studies of Dr. Henri Deplangue, cresylic acid, or cresylol, is superior to phenol as an antiseptic, while it is 75 per cent. less toxic to animals. The author's experiments were made by means of cultures of the bacilli of the principal zymotic diseases.—Bull. Gén. de Thérap., Aug. 15, 1888; Amer. Jour. Phar., Oct. 1888, 510.

Guaiacol—Characters.—A writer in "Pharm. Weekbl." states that guaiacol should constitute an oily, refractive, when freshly distilled colorless liquid, of pleasant aromatic odor, sp. gr. 1.117, slightly soluble in water 1:1000, easily soluble in alcohol and ether. 2 c.c. each of guaiacol and solution of soda (sp. gr. 1.30) evolve considerable heat when mixed, and on cooling form a white crystalline solid mass. 5 c.c. guaiacol, agitated with 10 c.c. glycerin (sp. gr. 1.19), should not be decreased in volume. 2 c.c. guaiacol, 4 c.c. benzin, and a few drops of water, cause an immediate separation of the guaiacol. An aqueous solution with Fe_2Cl_6 gives first a yellowish, afterwards a pure brown color. Three drops of guaiacol, dissolved in 5 c.c. absolute alcohol, with a very dilute Fe_2Cl_6 solution, gives first a blue solution, changing at once to green.—Apoth. Ztg., 1889, 324.

Guaiacol—Remedial Value.—D. I. Leech reviews the results that have been obtained with guaiacol as a remedy in phthisis by different practitioners, such as Sommerbrodt and Fränkel, H. Sali, M. Schueller, Fraentzel, and J. Horner. These results are in the main favorable, and point out that its application deserves further trial and study. Incidentally the author draws attention to the distinction from "creasote" as follows: Creasote is a composite substance containing various constituents, of which guaiacol, or catechol (pyrocatechin) monomethyl ether $C_6H_4\left\{\begin{matrix}OH\\OCH_3\end{matrix}\right.$ is the most important, 60 to 90 per cent. of beech-wood creasote consisting of this ether. The specimens of creasote sold for medicinal purposes are by no means uniform as regards their composition, and, not unfrequently, so-called creasote consists chiefly of carbolic acid.

Guaiacol is a highly refractive colorless liquid, with an aromatic smell, slightly soluble in water, readily so in alcohol and fixed oils.—Amer. Jour. Pharm., Nov. 1888, 578–579; from Med. Chronicle, Sept. 1888.

Sozoiodol—Compounds, Properties and Uses.—Leopold Larmuth communicates the results of his experience with sozoiodol (see Proceedings 1888, 502), a compound which was introduced by the firm of H. Tromsdorff as a substitute for iodoform. It is chemically an iodated phenyl sulphonic acid, more exactly diiodoparaphenolsulphonic acid. It is pre-

pared in the following manner: By the action of concentrated sulphuric acid on phenol, one of the H atoms of the benzol ring is replaced by the group SO_3H. The body $C_6H_4<^{OH}_{SO_3H}$ being obtained, potassium salt of this acid is prepared, dissolved in water, and treated with iodine chloride. By this means two hydrogen atoms of the benzol ring are replaced by iodine, and the potassium salt of the iodated acid separates out $C_6H_2 \begin{cases} OH \\ I_2 \\ SO_3K \end{cases}$; it is purified by repeated crystallization from water and dried. It occurs in the form of regular. well-formed, colorless and odorless crystals, which are slightly soluble in cold water, 1.8 parts being dissolved in 100 parts of water at 17° C.: it is much more soluble in warm water, and slightly soluble in glycerin and alcohol. From this body sozoiodolic acid and all the other salts are prepared. The free acid crystallizes from water in the form of needle shaped prisms; it is freely soluble in water, alcohol, and glycerin. With regard to the position of the iodine atoms, Herr Ostermeyer, the discoverer of the body, considers that they are in close proximity to the hydroxyl group. Various salts have been prepared; the chief which have, however, been therapeutically investigated, are those of sodium, potassium, zinc, and mercury. The sodium salt is much more soluble than that of potassium; it contains two molecules of water, and is soluble in cold water and glycerin to the extent of 6 per cent. The zinc salt is somewhat more soluble. The mercury salt occurs in the form of a fine yellow powder; it is almost insoluble in water, but pretty freely soluble in sodium chloride solution. Besides these compounds, salts of aluminium, magnesium, lead, barium, silver, and ammonium have been prepared. Sozoiodolic acid and its salts are effective antiseptics. The author has used sozoiodol compounds for some time, and reports most favorably on the results obtained; especially in rhinopharyngitis and rhinitis is this the case; the surfaces clean under the influence of the drug, and show a decided tendency to heal. In chronic purulent otitis the drugs have rendered very good service both in solutions and in insufflations.

With respect to the doses of the several salts, the sodium compound is used pure, or dissolved in water 3 to 10 per cent.: gauze and wool impregnated with this salt are now prepared, and are most convenient for wound dressings. If a prolonged action is wanted, the less soluble potassium salt is used, either pure or mixed with talc or milk sugar, five to ten per cent.; as ointments, all the salts are used made up with lanolin as base in the strength of five to ten per cent.; as pastes they may be used in like concentration with zinc, starch, and lanolin or vaselin bases. For insufflations the sodium and potassium salts are used undiluted; the zinc with milk sugar, ten per cent.; the mercury salt, five to ten per cent. with milk sugar.—The Medical Chronicle, October, 1888.

Sozoiodol—Preparation.—The following preparations of sozoiodol are given in "Nouv. Rem." (Nov. 24, 1888),: A five to ten per cent. solution retards the development of pyogenous cocci; 10 per cent. solutions prevent the development of microbes; 20 per cent. solutions render gelatin sterile. In doses of 1 gm. sozoiodol is not toxic to rabbits. For open wounds, 2 or 3 per cent. solutions of the acid (diiodoparaphenol-sulphonic) with the salts of sodium or aluminium are used. For a prolonged action the sozoiodol of potassium is mixed dry with powdered talc or milk sugar in quantities of 5 to 10 per cent. For ointments, sozoiodol of potassium, sodium, aluminium or lead may be used in the proportion of 5 to 10 per cent., with lanolin. For insufflations, the sodic or potassic salt is mixed with sugar of milk. The same is true of the zinc salt which may contain 1 to 10 per cent.; and the mercury salt, which should be made with 5 to 10 of the latter to 90 or 95 of sugar of milk.—Amer. Jour. Pharm., Jan. 1889, 17.

Resorcin—A new test for *chloral* and *chloroform*, which see.

Resorcinol—Use as a Test for Nitrates.—David Lind finds that resorcinol is a very delicate reagent for nitrates. The reagents required are:

An aqueous solution of resorcinol 100 c.c. containing 10 grammes of the phenol.

Solution of hydrochloric acid, about 15 per cent.

Pure concentrated sulphuric acid.

0 5 c.c. of nitrate solution, taken for each test. I drop of hydrochloric acid, 1 drop resorcinol solution, and 2 c.c. sulphuric acid. Test-tubes 5/8 inch in diameter. White background. Three or four tests made together at each dilution of nitrate.

N_2O_5 dilution.	Reaction.
1,000,000.	Faint purple, not sufficiently definite to be reliable, even after long standing.
500,000.	After some time a definite purple. Color permanent.
100,000.	At first purple-red; after an hour pronounced purple. Takes several hours to develop fully. A beautiful color and very permanent.
50,000.	After some time purple color very intense. Lower portion of band fine purple-red.
20,000.	After some time color so intense that it can only be distinctly seen in the upper portion of band by transmitted light.
10,000.	Color so intense can only be seen distinctly in the lower portion of band. Vivid purple-red.

Without hydrochloric acid, resorcinol is not of the least value as a test for nitrates; with the addition of the acid, it is perhaps one of the best reagents we possess for the purpose. It is fully five times more delicate than carbolic acid, and the final purple color which the bands acquire is very permanent. The blank tests with distilled water, hydrochloric acid, etc., show a faint compound band, pink above, yellow below; this cannot possibly be mistaken for the definite purple band which the test gives

with N_2O_5, even at a dilution of 500,000. One drop copper solution (two per cent. sulphate) added to the test was found to increase the intensity of the band, but not to a very remarkable extent; the metal may therefore be dispensed with when this phenol is employed.—Chem. News, Oct. 12, 1888, 176–177.

Skatol—Occurrence in the Vegetable Kingdom.—Professor W. R. Dunstan has subjected a specimen of wood from the "Hanbury Collection," labeled "*Celtis reticulosa,*" and characterized by an intolerable odor, to chemical investigation. From about 200 grams of the wood he obtained by distillation a minute quantity of a crystalline body, possessing the odor of fæcal matter, which proved on further investigation to be "skatol," which Brieger isolated in 1877 from human fæces, and Salkowski soon afterward from among the putrefaction products of animal proteid. The substance has hitherto not been observed in the vegetable kingdom. Chemically it is Pr. 3 methyl-indol. Indol, which is associated with the human fæces, was not found in the wood of *Celtis reticulosa.*—Pharm. Jour. and Trans., June 15, 1889, 1010.

Phloroglucine—Nitrite of Potassium.—Test not Characteristic.—Messrs. Cazeneuve and Hugouneng find that Werelky's reaction for phloroglucine (the yellow and then orange coloration followed by a vermilion-red precipitate given by potassium nitrite) may also be produced by phenol, resorcin, orcine, naphthol α and β, in aqueous solutions at 1 part in 2000.—Chem. News, July 13, 1888, 24; from Bull. Soc. Chim., xlix, No. 5.

Ergosterin—A Body Resembling Cholesterin from Ergot.—C. Tanret has obtained from ergot a cholesterin-like body, which is, however, distinct from the latter in its chemical composition, and for which he, therefore, proposes the name of "Ergosterin." To obtain the new body, ergot is extracted with alcohol, the alcohol is evaporated, the residue taken up by ether, and the ethereal solution evaporated. An oily mass of crystals remains, from which the oil is separated by recrystallizations from alcohol. The yield was 0.2 from 1000. The new substance is nearly insoluble in water, requires 500 parts of cold or 32 parts of boiling alcohol for solution, is soluble in 80 parts of alcohol, and in 45 parts of chloroform. It melts at 154°, and boils under a pressure of 2 cm. at 185°. It contains water of crystallization, which it loses at about 110°, the composition of crystallized ergosterin being $C_{26}H_{40}O+H_2O$. The crystals are slowly oxidized on exposure to air, acquire color, and a pleasant odor; the oxidation being rapid at 100°. The author has prepared and describes the ethers of acetic, formic and butyric acid, ergosterin, like cholesterin, having the properties of a monatomic alcohol.—Arch. d. Pharm., May 1889, 468–469; from Jour. de Pharm. et de Chim., 1889, xix, 225.

Cholesterin—Composition.—The formula for cholesterin hitherto accepted is $C_{26}H_{44}O$. Frederick Reinitzer has now completed a series of

experiments which prove the formula to be undoubtedly $C_{27}H_{46}O$. This formula is proven by numerous compounds made by the author. By treating cholesterin with anhydrous acetic acid he obtained

Cholesteryl Acetate—$C_{27}H_{45}.C_2H_3O_2$.—This, when melted on an object glass and covered with a cover-glass, shows under the microscope a peculiar play of color. By reflected light a lively emerald-green color is first observed, which rapidly spreads over the entire surface of the substance, then changes to blue-green, partially also to deep blue, then to green-yellow, yellow, orange-red, and finally deep red. The cooler points then congeal to a mass of spheroid crystals, which, spreading rapidly, obliterate the color reaction.—Arch. d. Pharm., Aug. 1888, 747; from Monatsh. f. Chem., 9, 421.

Glycerin—Determination in the Crude Article.—A rapid and convenient method for determining the value of crude glycerin has been devised by R. Benedikt and M. Cantor. It is based upon the observation that when glycerin is boiled with anhydrous acetic acid it is converted quantitatively into triacetin. The mixture being then dissolved in water, the excess of acetic acid is neutralized accurately with soda solution. The trinitrin is then determined by saponifying with solution of soda, and the excess of the latter determined by titration. The test solutions necessary are: 1. ½—1/1 normal hydrochloric acid, the titre of which must be absolutely accurate; 2. *dilute* soda solution containing not more than 2 per cent. NaOH; 3. *concentrated* soda solution, containing 10 per cent. NaOH. Into a wide-necked flask, with rounded bottom, having a capacity of about 100 c.c., 1 to 1.5 gram of the crude glycerin are placed; then 7 to 8 grams anhydrous acetic acid and about 3 grams of anhydrous acetate of sodium are added, and the mixture is boiled with the aid of a reverse condenser from 1 to 1½ hours. After cooling somewhat, the mixture is diluted with 50 c.c. water, and again heated until it commences to boil, using the reverse condenser as before. When the oil in the bottom of the flask is dissolved, the liquid is filtered into a wide-necked flask of 400 to 600 c.c. capacity, the filter is well washed, and the filtrate allowed to cool completely. A little phenolphthaleïn is added, and the liquid accurately neutralized with the *dilute* soda solution, neutrality being indicated when the faint yellowish color of the solution changes to reddish-yellow, Now 25 c.c. of the *concentrated* soda solution are added, the mixture is boiled for a quarter of an hour, and the excess of the soda solution is then determined by titration with the above mentioned hydrochloric acid. The amount of soda in 25 c.c. of the concentrated soda solution having been determined by titration, the difference between the two titrations gives figures from which the amount of triacetin (and consequently glycerin) is readily calculated.—Arch. d. Pharm., Oct. 1888, 946; from Monatsh. f. Chem., 9, 521.

Commercial Glycerin—Presence of Arsenic.—E. Ritsert in examining

commercial glycerin finds all specimens to contain arsenic if examined by Gutzeit's test (which see under "Arsenic"). After testing the reagents the procedure is to place 1 c.c. glycerin, 1 c.c. water, 15 drops hydrochloric acid and 0.6 zinc in a long test tube and allow the gas to act upon filter paper moistened with a strong solution of silver nitrate. The reaction was not due to H_2S or H_3P, as the addition of iodine solution did not prevent the reaction. The presence of the arsenic is traceable to the sulphuric acid used in decomposing the fat. Ammoniacal silver solution is a good test for arsenic. Dependent upon the quantity present, there is produced a mirror, gray deposit or an opalescence. —Pharm. Ztg., 1889, 104.

Glycerin—Tests of Purity.—According to E. Ritsert, pure glycerin should conform to the following tests: 1. Neutrality towards litmus paper; 2. Complete volatility between 150° and 200°, one drop heated on an object-glass over a moderate flame should leave no residue; 3. Non-reducibility of ammoniacal silver nitrate—1 c. c. of the sample heated to the boiling point with 1 c. c. ammonium hydrate and five drops of silver nitrate solution added should not become colored nor deposit a precipitate within five minutes.—Pharm. Ztg., 1888, 715.

Glycerin—Borax a Test.—A writer in "Pharm. Post" (1888, 487) states that the property of glycerin to displace boric acid in borax may be used in the following manner: The solution to be tested and a solution of borax are slightly colored by addition of a few drops of litmus solution and the two blue liquids mixed; in presence of glycerin the liquid is reddened, owing to the liberation of boric acid. The red color on heating becomes blue, but on cooling reappears.

Glycerin—Action upon Vulcanized Rubber.—Morelet states that vulcanized rubber dipped suddenly into boiling glycerin takes the characters of non-vulcanized rubber, *i. e.*, that its parts can readily be joined and that it dissolves in the usual solvents of caoutchouc. The glycerin must be boiling at the time of first contact.—Amer. Jour. Pharm., June 1889, 287; from Soc. de Phar. de Paris, April 3, 1889.

Boroglycerides—Preparations of Various Compounds.—E. Hirschsohn has studied the products obtainable by using various molecular ratios, and finds the following to give most satisfactory results:

Boroglyceride, distinguishable by its solubility in two parts 95 per cent. alcohol and in twelve parts water, is made by heating on a sand-bath 62 parts boric acid (1 mol.) and 95 parts glycerin (1 mol.) until a portion removed becomes solid on cooling.

Sodium boroglyceride, 38 parts powdered borax (1 mol.) and 38 parts glycerin (4 mol.) gave a pale yellow vitreous mass, completely soluble in two parts alcohol and also in two parts water.

Calcium boroglyceride, made, owing to the variable nature of commer-

cial calcium borate, by taking freshly slaked lime 7.4 parts (1 mol.) and boric acid 24.8 parts (4 mol.), mixing intimately and heating with 76 parts glycerin (8 mol.); solubility same as Na compound.

Magnesium boroglyceride, made in the same manner as the preceding, magnesia 4 parts (1 mol.), boric acid 24.8 parts (4 mol.), glycerin 76 parts (8 mol.). This compound, very soluble in alcohol and water, appears under the name of "Antifungin," as an aqueous solution of some merit in throat affections.

The use of more glycerin in these preparations yields hygroscopic products, more boric acid or borate, less soluble products. If the metallic compounds be treated with ether or acetic ether, they are decomposed into boric acid, soluble in the menstruum, and a compound of the base with glycerin which is insoluble in the ethers, but afterwards is readily soluble in water, the solution possessing an alkaline reaction.—Pharm. Ztschr. f. Russl., 1889, 1, 17.

Glyceric Aldehyde—A Synthetic Fermentible Sugar.—According to the investigations of E. Grimaux, oxidized glycerin yields "glyceric aldehyde" ($C_3H_6O_3$) which is capable of alcoholic fermentation. "This is the first time that a fermentible sugar, possessing the same reactions as the glucoses, has been obtained synthetically. The definition of fermentible sugars should be modified, as they are not necessarily carbohydrates, containing C_6 or C_{12}, since their characteristic properties appear also in glyceric aldehyde.—Chem. News, July 6, 1888, 13; from Bull. Soc. Chim., xlix, No. 4.

FIXED OILS.

Fixed Oils—Determination of Quality and Adulterants.—For years chemists have endeavored to devise a convenient as well as accurate method, or methods, for determining the quality and purity of fixed oils. Their close relationship and their almost identical qualitative composition have, however, hitherto been a serious obstacle; and notwithstanding that innumerable methods have been proposed, such being based on the physical as well as chemical relations of the oils, the difficulties that present themselves are yet far from being overcome, though good results have here and there been obtained. W. Peters has now subjected the different methods that have been proposed to critical examination and comprehensive experiment, and has arrived at conclusions which, if found correct, will tend greatly towards simplifying the examination of fixed oils. He concludes that the following work is necessary for the recognition of adulterations in fixed oils:

1. *The determination of the melting points of the acid mixtures, insoluble in water, obtained after saponification by the addition of hydrochloric or sulphuric acid.*—In the case of pure olive oil the melting point will be found to fluctuate between 24° and 29°C. If the melting point of such acid

mixtures is above 29°C., it may be accepted as certain evidence that the sample is adulterated with cotton seed oil; if below 24°C., an admixture of linseed, ricinus, or poppy-oil may be looked for.

2. *Sesame oil in olive or almond oil is readily recognized by the colorations that are produced when the oils are mixed with nitric and sulphuric acid, with hydrochloric acid containing sugar, or with nitric acid alone.*—Cotton seed oil is determined by the color produced by the admixture of the oil with nitric acid or with a concentrated solution of antimonious chloride. The oils of cruciferous seeds are recognized by their property of reducing an alcoholic solution of silver nitrate. Groundnut oil, on the other hand, cannot be determined by the color-reaction with acids.

3. *The Color Reactions Produced by the Elaïdin Reaction* reveal the presence of cotton—sesame—and peach kernel oil; the greater or less, the more rapid or the slower congealing of the oil by this test is a less certain criterion.

4. *The difference in the solubility in 90 per cent. alcohol of the fatty acids separated by acids after the saponification of the oils* may enable the determination of the presence of cotton and ground-nut oil in olive and almond oil, the alcohlic solutions of the former becoming turbid at 15° C., whilst those of the latter remain clear.

5. *The determination of the iodine-number according to the method of Hübl is useful.*—According to the experiments so far made, the limit for olive oil lies between 80.2 and 85; if the iodine number exceeds 85, the olive oil may be regarded as adulterated; nevertheless, if the number found is between 80.2 and 85 it is necessary to make other determinations of purity.

The author's paper will be found useful to students of this subject, since it appears to give a succinct review of all the methods that have hitherto been proposed and applied for the examination of fixed oils. See Arch. d. Pharm., Oct. 1888, pp. 857–893 and 905–918.

Fixed Oils—Solubility in Phenol as a Means of Detecting Paraffin and Other Oils in Admixture.—Theodore Salzer has made experiments with a view to determine a convenient method for detecting an admixture of paraffin oils, and certain others, in the fixed oils of the Pharm. Germ. It occurred to him that paraffin oil might be used as an adulterant of the vegetable oils, and that such might be detected by its sparing solubility in liquid phenol, such oils as almond, olive, etc., being comparatively soluble in the officinal liquid carbolic acid. While the results of his experiments as yet do not seem to admit of practical application, they nevertheless point out possibilities, and if they are followed up may be found useful. It may be briefly stated that the author has found carbolic acid useful in three strengths: 1. An acid containing 91 per cent. pure crystallized phenol, obtained by liquefying 1 kilogram of pure acid and

adding 100 c.c. of water; 2. An acid containing 87 per cent., obtained by diluting 110 grams of the 91 per cent. acid with 5 c.c. of water; and 3. An acid containing 83.3 per cent., obtained by diluting 110 grams of the 91 per cent. acid with 10 c.c. of water. When the carbolic acid is stronger than 91 per cent., it appears to dissolve increased quantities of fixed oil, in about the same quantities, there being no distinction until a dilution to 91 per cent. is reached; whilst when of less strength than 83 per cent., the solubility of oils is reduced to a minimum. The following examples will illustrate the difference in the solvent effect of liquid carbolic acid of different strengths:

10 c.c. of 91 per cent. carbolic acid will dissolve 12 c.c. pure almond oil or 11 c.c. containing 5 per cent. of paraffin oil, or 5 c.c. containing 10 per cent. of paraffin oil. The same quantity of 87 per cent. carbolic acid, however, will dissolve only 3 c.c. of pure almond oil, only 1 c.c. of almond oil containing 5 per cent. of paraffin oil and only 0.3 c.c. of such containing 10 per cent. of paraffin oil. Again, 10 c.c. of the 91 per cent. phenol will dissolve 12.5 c.c. of pure olive oil, 10.5 c.c. of olive oil containing 10 per cent. paraffin oil, and 12 c.c containing 5 per cent. paraffin oil; the 87 per cent. phenol will dissolve 2.5. 0.1 and 0.8 c.c. under the same conditions, while the 83 per cent. phenol will dissolve only 0.6 c.c. of the pure oil, and none of either of that mixed with 5 per cent. or 10 per cent. of paraffin oil. The author gives in the form of tables the results obtained under similar conditions with almond oil, olive oil, rape oil, linseed oil, fish oil, poppy oil, and variable mixtures of the one with the other, for which, as well as the details of his method and experiments, reference may be had in Arch. d. Pharm., May 1889, 433–448.

Fixed Oils—Rate of Iodine Absorption.—J. A. Wilson, in connection with a paper on the detection of cotton seed oil and beef fat in lard, remarks that somewhat discrepant statements exist as to the iodinic absorption of cotton seed oil and lard, as well as of beef fat. He considers it desirable that chemists should state their experience with this most excellent test, and he gives the maximum and minimum absorptions of iodine as found by him for common fixed oils, as follows:

Name of Oil or Fat.	Maximum Absorption.	Minimum Absorption.
	Per cent.	Per cent.
Cotton-seed oil	110.11	106.0
Linseed oil	149.10	148.07
Rape oil (Stettin)	102.76	100.43
Castor oil	83.40	. . .
Palm oil	52.40	51.01
Olive oil	84.00	78.50
Neatsfoot oil	70.70	70.00
Cocoanut oil	9.35	8.97
Lard	60.00	57.10
Beef fat	44.00	43.26
Mutton fat	46.19	45.18
Bone fat	49.58	46.27
Tallow	41.98	40.01

For the detection of

Cotton Seed Oil and Beef Fat in Lard.—The author finds the iodo-mercuric chloride test of Hübl to be one of the most delicate and best in the chemistry of oils and fats. The surface tension test of Mr. Warren, which depends on the assumption that pure dry melted lard, dropped on water of 100° F., does not extend or increase in size, while beef fat or mutton fat extends over the surface of the basin in proportion to the amount present—cannot be used, because in his experience old lard will behave precisely like beef fat.—Chem. News, March 1889, 99.

Fixed Oils—Detection of Cotton Seed Oil.—E. Hirschsohn has found that a chloroformic solution of auric chloride (1 gm. in 200 c. c.) gives on warming with cotton-seed oil an intense raspberry-red color, while pure olive oil with the same reagent gave no reaction. To apply the test, 3 to 5 c. c. of the oil with 6–10 drops of the auric chloride solution are placed in a water-bath and heated to 100° for twenty minutes. *Cotton-seed oil* develops the color in a few minutes; of other oils tested *hemp, linseed, poppy, almond, olive, rape, turnip, mustard, sesamum, sunflower, peach-kernel* and *grape-seed oils* gave no reaction; *peanut* and *castor oils* gave a slight deposit of metallic gold without imparting any color to the oils. The addition of 20 per cent. cotton-seed oil to the *drying oils* could not be detected, while the addition of 10 per cent. could be detected in *peanut, poppy, turnip, castor, olive, sesamum, almond* and *sunflower oils.* The prettiest tests were gotten with olive, sesamum, and almond oils. Further experiments with olive oil proved that the addition of *one per cent.* of cotton-seed oil could certainly be detected by the method given above. By noticing the depth of color and the time required to produce it, approximate results can be obtained.—Pharm. Ztschr. f. Russl., 1888, 721.

Fixed Oils—Application of Gold Chloride and Silver Nitrate as Tests.—The above statements of Mr. Hirschsohn have induced Frank X. Moerk to repeat the test upon different oils, comparing the results at the same time with those obtained by the nitrate of silver method of O. Hehner, which consists in mixing the suspected oil with half its volume of a test solution (composed of 1 gm. silver nitrate, 200 c.c. alcohol, 40 c.c. ether, and 0.1 gm. nitric acid), and exposing the mixture on a water bath, at 100° C. for fifteen minutes, noticing the effect produced. The oils examined by the author were divided into three groups: (1) oils of undoubted purity and reliability as to source; (2) commercial oils corresponding to those of group 1; (3) commercial oils of which no *reliable* specimens were examined, and hence cannot be commented upon.

In giving the results of the reagents with $AuCl_3$, the time of observation was twenty minutes; if a color appeared sooner, the time is given; with silver nitrate, *a* indicates the effect in fifteen minutes, *b* in one hour:

1. PURE OILS.

1. Pure Oils.	$AuCl_3$.	$AgNO_3$.
Almond	No change.	*a*, light brown; *b*, red color.
Arachis	Red in 3 minutes.	*a*, dark red color; *b*, dark gray green, almost solid.
Ben	" 5 "	*a*, no change; *b*, brownish.
Burdock fruit	Precipitate of met. gold	*a*, green brown, precipitate; *b*, very dark brown.
Corn	" " "	*a*, dark red color; *b*, precipitate.
Cotton-seed 1	Red in 5 minutes.	*a*, gray green, ppt.; *b* no change.
" " 2	" 3 "	*a*, " " " *b* no change.
" " 3	" 5 "	*a*, " " " *b* no change.
" " 4	" 4 "	*a*, dark " " *b* no change.
" " 5	" 3 "	*b*, gray " " *b* no change.
Hemp-seed (dark)	Indistinct dark color.	*a*, dark green color; *b*, no change.
Lard	No change.	*a*, no change; *b*, gray black, ppt.
Mustard	" "	*a*, green black, ppt.; *b*, no change.
Olive, Mottet, (4 yrs old)	" "	*a*, greenish, slight ppt.; *b*, no change.
" " (6 mos. ")	" "	*a*, greenish, slight ppt.; *b*, no change.
" Lucca	" "	*a*, greenish, slight ppt.; *b*, no change.
" Kimball	Slight precipitate of Au.	*a*, greenish; *b*, solid.
Peach-kernel	No change.	*a*, light brown; *b*, gray black, ppt.
Poppy-seed (imported)	Red in 3 minutes.	*a*, light brown; *b*, solid.
" " 2 (fresh)	Precipitate of met. gold.	*a*, dark brown; *b*, ppt. remain liquid.
" " 3 (old)	" " "	*a*, black, ppt; *b*, dark brown, ppt. remain liquid.
Rape	No change.	*a*, dark green; *b*, ppt.
Sesame	" "	*a*, green black, ppt.; *b*, no change.
Sophora	" "	*a*, light brown, ppt.; *b*, dark green ppt.
Sunflower	" "	*a*, greenish; *b*, dark red brown.
Walnut kernel, American	Red in 2 minutes.	*a*, brown color; *b*, green, black, ppt.

2. COMMERCIAL OILS.

2. Commercial Oils.	$AuCl_3$.	$AgNO_3$.
Almond 1	Red in 5 minutes.	Red color, *a*, dark; *b*, very thick.
" 2	No change.	*a*, pale brownish; *b*, gray black, ppt.
Arachis	Red in 3 minutes.	Red color, *a*, dark; *b*, brown black solid.
Lard 1	No change.	*a*, no change; *b*, brownish black, precipitate.
" 2	" "	*a*, no change; *b*, gray black, ppt.
Mustard	" "	*a*, dark, ppt.; *b*, dark green, ppt.
Olive 1 (green)	Red in 3 minutes.	*a*, pale brown; *b*, dark red brown.
" 2	No change.	*a*, greenish; *b*, solid.
" 3	Red in 3 minutes.	*a*, gray green, ppt.; *b*, no change.
Poppy-seed	" 3 "	*a*, pale brown; *b*, pale yellow, solid.
Rape	No change.	*a*, dark green, ppt.; *b*, no change.
Salad	Red in 3 minutes.	Red color, *a*, green, ppt.; *b*, gray black, thick.

3. COMMERCIAL OILS.

3. Commercial Oils.	$AuCl_3$.	$AgNO_3$.
Castor 1	Slight precipitate of gold.	*a*, reddish; *b*, fluorescent, dark-red, thick.
Castor 2	No change.	*a*, reddish; *b*, fluorescent, dark-red, thick.
Croton	No change.	*a*, no change; *b*, dark-green, solid.
Cod liver 1	Red in 4 minutes.	*a*, dark-brown; *b*, no change.
Cod liver 2	Slight precipitate of gold.	*a*, pale-red; *b*, gray-brown.
Fish (good sample) . . .	Dark red in 20 minutes.	*a*, dark-red; *b*, no change.
Neatsfoot 1	Red in 12 minutes.	*a*, greenish; *b*, solid.
Neatsfoot 2	No change.	*a*, yellowish; *b*, brownish, solid.
Linseed 1 (cold pressed)	No change.	*a*, brown color; *b*, gray-black, precipitate, thick.
Linseed 2	Red in 3 minutes.	*a*, red-brown; *b*, dark brown, thick.
Linseed 3	No change.	*a*, no change; *b*, yel. green, ppt. "
Linseed 4	No change.	*a*, no change; *b*, greenish, ppt. "
Sperm 1	Red in 5 minutes.	*a*, brown; *b*, no change.
Sperm 2	No change.	*a*, light brown; *b*, green black, ppt.

Finally a few mixtures of olive and cotton seed oils were made, containing one, five and ten per cent. of the latter oil, and subjected to the gold chloride test; the ten per cent. mixture gave on warming for 12 minutes a red color, very distinctly; the five per cent. mixture did not react in twenty minutes, but if heated for one-half hour slowly giving a precipitate of metallic gold; the one per cent. mixture showed no color whatever with gold chloride, but with silver nitrate gave a slight deposit on the sides of the test tube. The separation of metallic gold by a number of the oils is probably traceable to the amount of reducing acid present being insufficient to give the red color. It seems evident from the author's results that neither of the methods is absolutely and uniformly available for the purposes intended.—Amer. Jour. Pharm., Feb. 1889, 65–68.

Fixed Oils—Removal of Rancidity.—For the removal of rancidity in oils Dr. H. Hager uses alcohol of 85–87 per cent., which by dissolving the free fatty acids renders the oil again sweet and fit for use; one volume of the oil warmed to 35°C. is thoroughly and repeatedly agitated during twelve hours with one to one and a quarter volumes of alcohol, allowed to separate and the upper (alcoholic) layer removed. The oil is shaken a second and, if necessary, a third time with half a volume alcohol. Proceeding as above from a rancid olive oil (six to eight years old), 0.86 per cent. free fatty acids were obtained; the alcohol can be recovered by distillation, making the process a cheap one. Of a large number of oils examined, castor oil alone could not be purified in this manner, owing to its affinity for alcohol; with alcohol of more than 50 per cent. this oil increases in volume, and the alcohol dissolved is removed with considerable difficulty. There are some oils in which the free fatty acids are desirable, as cod liver oil, croton oil, and the fixed oil of laurel, to which the process is not applicable.—Pharm. Ztg., 1889, 192.

Fat—New Method for its Determination in Milk, etc.—Dr. Werner Schmid proposes the following new method for the estimation of fat in milk, cream, etc., which is expeditious, and, in his opinion, perfectly accurate: Take a graduated test-tube, having a capacity of about 50 c.c., and divided into $\frac{1}{10}$ c.c., introduce into it 10 c.c. of the milk (or 5 c.c. of cream), then add 10 c.c. of concentrated hydrochloric acid, and boil the mixture, while moving the test-tube to and fro, until the contents assume a dark-brown color. Then cool the tube by immersing it in cool water, add 30 c.c. of ether, shake, and set it aside until the ether-layer has separated (the separation being sharp and clear). Having observed the volume of the ethereal layer, measure 10 c.c. of it into a tared porcelain capsule, and evaporate it on a water bath, aiding the evaporation by blowing air over it. Finally, dry at 100° C. in a hot-air bath, weigh, and calculate the result for the total ethereal layer. The execution of the assay in this manner need not consume more than 15 minutes.—Zeitsch. f. Anal. Chem., 1888, 488.

Fats—Determination of Melting Points by the Aid of a New Form of Apparatus, which see under "Pharmacy."

Olein—Proper Characters of a Good Commercial Article.—Dr. H. Hager gives the following as the proper characters of commercial olein suitable for pharmaceutical use: It may be yellowish, yellow, yellowish-red or brownish-yellow; must remain liquid at 20°, form a butter-like deposit at 15°, and congeal completely at 5°; the sp. gr. at 15° to 20° may fluctuate between 0.912 and 0.916. It should be dissolved in all proportions by alcohol of 85 per cent., mineral oils, resin oil, as well as neutral vegetable oils and fats, being insoluble in alcohol of that strength. It is also perfectly soluble in petroleum benzin, such showing the absence of saponified oil, as well as of water and alcohol. With 1½ to 2 times its volume of ammonia water it produces a firm, gelatinous mass.—Arch. d. Pharm., April 1889, 319–320; from Pharm. Centralh., 30, 130.

Oleic Acid—Transformation into Stearic Acid.—P. de Wilde and A. Reychler find that on heating for some hours to 270°–280° oleic acid with 1 per cent. of iodine, there is formed a mixture of fatty products which after cooling congeal into a solid mass, melting at 50°–55°. From this mixture the authors obtain washings containing about one-third of the iodine used and a watery distillate very poor in hydriodic acid, a distillate of tar insoluble in alcohol, liquid fatty products, generally very blue, not solidifiable by iodine, and saturating on acidimetric titration only 50 to 60 per cent. of the quantity of normal soda calculated for pure oleic acid. A maximum yield of 70 per cent. of a solid white acid with a high melting point. After crystallization from alcohol this product presents the chemical composition, the melting-point, and all the characteristics of stearic acid. In subsequent operations bromine was substituted for iodine as being more easy of recovery.—Chem. News, April 5, 1889, 168; from Bull. Soc. Chim., March 5, 1889.

Oleic Acid—Adulteration with Linoleic Acid.—According to Granval and Valser linoleic acid is used commercially for adulterating oleic acid. The author states that if a thin coating of the sophisticated oil be applied to a smoothly scraped lead plate, and exposed for twelve hours to the air, it will become gummified, while pure oleic acid remains, under like circumstances, nearly unchanged. Or, a small quantity of the suspected oil may be mixed with an equal amount of soda-lye. If linoleic acid be present an intense yellow color is produced; if the oleic acid be pure, the reaction is of a gray color.—Amer. Jour. Pharm., May 1889, 244; from Jour. de Ph. et de Chim., March 1, 1889.

Oleate of Mercury—Improved Process.—A. P. Brown finds that in preparing oleate of mercury by decomposing Castile soap, as recommended by Dr. Wolff (see Proceedings 1882, 359–360), the continued boiling will decompose the oleate and a black precipitate will also form, and instead of being of a beautiful yellow color, a dark mixture resembling mercurial ointment would be the result, consisting of a mixture of oleate and oxide of mercury. He finds the following an improvement on Dr. Wolff's process:

Take of white Castile soap, in fine powder, ℥viii; bichloride of mercury, in fine powder, ℥iij+ʒij. Mix them carefully together in a mortar and add distilled water sufficient to form a pasty mass; throw this immediately into boiling water, and boil carefully until a yellow oily liquid is formed; allow to cool, pour off the water, and wash the resulting oleate with distilled water until tasteless; place it in an evaporating dish and heat on a water bath until all the water is driven off. By following this process an oleate of mercury will be obtained resembling very much recently prepared citrine ointment. This can be diluted with lard or lanolin to any desired strength; lanolin being more suitable as a diluent than lard, and particularly, vaselin or cosmolin.—Amer. Jour. Pharm., April 1889, 168–169.

Drying Oils—Preparation with Manganese Oxalate.—J. Castelhaz states that oils prepared with manganese oxalate may be advantageously substituted for drying oils in all their applications by reason of beauty and other properties. From 2 to 5 per cent. of manganese is sufficient for boiling oils. The manganese salt is first ground up with 1 or 2 parts of the oil to be boiled, and this mixture is added very gradually to the bulk of the oil, stirring well. The oil is heated very gradually at first, but after the escape of the gases it may be boiled in the ordinary manner. —Chem. News, Jan. 18, 1889, 36; from Bull. Soc. Chim., 1888, No. 11.

Linseed Oil—Industrial and Analytical Importance of Its Oxidation.—A. Chenevier considers that the oxidation of linseed oil by the method proposed by Livache may constitute an industrial procedure capable, in certain cases, of superseding the boiling oils with litharge. It may also furnish indications on the drying quality of any oil by an observa-

tion of the time which it requires, when once prepared, to dry upon a plate of glass. We have thus the advantage of knowing the drying properties of the oil, independently of substances which may be mixed with it afterwards. But it is inaccurate to rely upon the increase of weight of the oil, for it is too variable according to circumstances which are independent of its quality. For a linseed oil the best index of quality is still the specific gravity. The higher the gravity of an oil the better it dries. This is the difference between oils from French and from foreign seeds. (Bombay, Calcutta, La Plata, etc.) The specific gravity of the former is always at least 0 9325, whilst the oils from foreign seeds are often below 0.932.—Chem. News, Jan. 4, 1889, 12; from Mon. Scient. Quesn., Oct. 1888.

Walnut Oil—Characters.—In the course of examining fixed oils, Thomas T. P. Bruce Warren had occasion to prepare and examine also walnut oil. The walnuts were harvested in the autumn of 1887, and kept in a dry, airy room until the following March. The kernels had shrunk up and contracted a disagreeable acrid taste, so familiar with old olive oil in which this has been used as an adulterant. Most oxidized oils, especially cotton-seed oil, reveal a similar acrid taste, but walnut oil has, in addition, an unmistakable increase in viscosity. The nuts were opened and the kernels thrown into warm water, so as to loosen the epidermis; they were then rubbed in a coarse towel, so as to blanch them. The decorticated nuts were wiped dry and rubbed to a smooth paste in a marble mortar. The paste was first digested in CS_2, then placed in a percolator and exhausted with the same solvent, which was evaporated off. The yield of oil was small, but probably, if the nuts had been left to fully ripen on the trees without knocking them off, the yield might have been greater. It is by no means improbable that oxidation may have rendered a portion of the oil insoluble. The decorticated kernels gave a perfectly sweet, inodorous, and almost colorless oil, which rapidly thickens to an almost colorless, transparent, and perfectly elastic skin or film, which does not darken or crack easily by age. These are properties which, for fine art painting, might be of great value in preserving the tinctorial purity and freshness of pigments.

Sulphur chloride gives a perfectly white product with the fresh oil, but when oxidized the product is very dark, almost black. The iodine absorption of the fresh oil thus obtained is very high, but falls rapidly by oxidation or blowing. A curious fact has been disclosed with reference to the oxidation of this and similar oils. If such an oil be mixed with lard oil, olive oil, or sperm oil, it thickens by oxidation, but is perfectly soluble. Such a mixture is largely used in weaving or spinning. Commercial samples of linseed oil, when cold drawn, have a much higher iodine absorption, probably due to the same cause. Oils extracted by CS_2 are very much higher than the same oils, especially if hot pressed.—Chem. News, June 14, 1889, 279–280.

Cotton Seed Oil—Purification.—G. Tall and W. P. Thompson, propose normal carbonate of sodium as a substitute for caustic soda, usually employed for the purification of cotton seed oil, being without action on the oil itself, though capable of extracting the coloring matter. When the bulk of the coloring matter has been dissolved out by this means, any remaining traces, together with a disagreeable taste which is apt to cling to the oil, are removed by treatment with Fuller's earth at 300°–350° F. The coloring matter can afterwards be used as a dye, either in the alkaline solution or after precipitation, preferably with hydrochloric acid, and resolution in an alkaline menstruum. When exhausted, the Fuller's earth can be regenerated by boiling with sodium carbonate, washing, and drying at about 300°–400° F.—Amer. Drugg., Feb. 1889, 27; from J. Soc. Chem.

Olive Oil—Distinction of California Oil from European.—Frank X. Moerk records the results of tests made upon two samples of Lucca oil and several samples of California oil, all of them being olive oils of undoubted purity. He found the California oils to differ decidedly from the foreign oils in some of the accepted tests of purity, these differences being mentioned as follows:

1. A high specific gravity: L. Archbutt, in 89 samples examined, found few oils to reach 0.917, his variations are stated between 0.9136 and 0.917; the U. S. P. and Pharm. Germ. adopted 0.915 to .918; if the presence of free acid is considered in the California oils, the specific gravities found are exceptionally high, the presence of free acid reducing the specific gravity considerably.

2. Intenser reactions with the acids: these tests should not be relied upon too implicitly, for two reasons: firstly, pure oils when fresh may be affected but little by acids, but after a time may be affected considerably; secondly, the oils used as adulterants, which at one time gave unmistakable color reactions, are now so fully purified as to give little reaction with these same tests; of eight samples of cotton-seed oil examined, no two gave like reactions with the acids.

3. The elaidin-reaction requires a longer time than with the European oils.

4. A higher percentage of free acid; to this are due the discordant figures gotten for the temperature-turbidity, but by an examination of these figures it appears that every per cent. of free acid in the oil reduces the temperature about 3° C.; if such a correction be made, figures near 85 are gotten.

5. A higher iodine-absorption for the native oil; this is very probably due to the presence of more olein than in the European oils, the melting point of the fatty acids also indicating this. There is another instance known, similar to this one, in which it has been proven that American fats differ in important respects from the same European fats; reference is made to lard. American lard has an iodine-absorption of from 60 to

62 per cent., English lard from 51.5 to 62 per cent. (See under "Lard".) From such results it would appear that climate and soil modify considerably the composition of the fats and oils, and for such variations due allowance must be made.

For the examination of olive oil, the specific gravity, elaïdin-reaction, iodine-absorption and fusing point of the fatty acids should be considered; in an adulterated oil all of these tests will tend to confirm the adulteration, and will give valuable clues to the nature of the adulterant.

6. The fatty acids of the American oils at a temperature of 20° C. are viscid fluids containing suspended the higher melting acids; the European oils are solid at this temperature. Under the microscope, the former show the same structure, long prisms, but the European oils differ considerably in appearance—a globular form predominating; they all polarize light. The author's paper is accompanied by a comprehensive table giving the reactions in detail.—Amer. Jour. Pharm., May 1889, 225–230.

Olive Oil—Method of Refining without Chemicals.—G. Seidel describes the following method of refining olive oil: The oil is put into a conical tub provided with a steam coil, and having a faucet inserted about ¾ inch above the bottom, and another about 4 inches above this, for draining off the oil. Alongside of this tub, which is placed on a stone floor, 5 or 6 clarifying tanks are arranged at different levels and resting upon strong wooden frames. They have a cylindrical form, and are provided with a perforated diaphragm about 1 to 1½ inches above the bottom, and a stop-cock at the side between the two. A layer of cotton, or preferably glass wool, is placed on the diaphragm. For every 100 lbs. of olive oil to be clarified, 10 to 15 lbs. of water are added. The mixture is then brought to a boil, by means of steam, and kept so for 2 or 3 hours. It is then allowed to rest for 24 hours, during which time the water will separate. On opening the stop cock the partially clarified oil is allowed to flow into the first clarifying tank. When this is full, its contents are allowed to flow into the second tank, and so on, the first tank being refilled from the steam tank as soon as a new lot of oil has been treated as described.—Amer. Drugg., Aug. 1888, 145; from Industriebl.

Olive Oil—New Method of Examination for Admixtures.—Thomas T. P. Bruce Warren observes that, inasmuch as lard oil is frequently met with in samples of olive oil, he has slightly modified the procedure for its separation. As poppy oil is almost invariably present in this mixture, the quantity of lard oil removed from the coagulum by CS_2 would not account satisfactorily for the low iodine absorption, considering the quantity of poppy oil which apparently was present. The presence of poppy oil is easily confirmed by passing ozone into the mixture for a short time, when a black product will be obtained by SCl_2, and the viscosity will be considerably increased. The lard oil is imprisoned in the altered oils and is difficult to remove entirely, but by boiling the coagulum in a moderately strong alkaline solution, almost the whole of the lard oil is

removed; the remaining mass is well washed with water, dried, and any adhering non-saponifiable oil removed by means of ether. If too strong an alkaline solution be used, it will partly decompose the altered oils, which will then be removed with the adherent lard oil when treated with ether. The dried mass is first weighed and placed in a filter-tube plugged with asbestos, ether is poured on, and the oily solution received in a tared flask; the residuum, after evaporation of the ether, is deducted from the weight of the mass. If the coagulum is first treated with CS_2, it is necessary to remove all traces of it before boiling with alkali. Knowing the iodine absorption of the mixture and the proportion of this absorption due to the recovered lard oil, we have the difference corresponding to the olive and poppy oils. If we know that two oils only are present, and we know the iodine absorption of each, we have no difficulty in fixing on the quantities of each necessary to give the required iodine absorption. The only uncertainty likely to arise is caused by the variation in poppy-seed oil from oxidation; when oxidized by age or exposure its iodine absorption will fall from 135 per cent. to 90 per cent. If we can feel sure of oxidizing the oil so as to obtain the minimum absorption, we could increase the certainty of the analytical result.—Chem. News, July 13, 1888, 15.

Olive Oil—Presence of Linolein as a Natural Constituent.—K. Hazura and A. Grussner find that the liquid fatty acid of olive oil is composed of about 93 per cent. oleic acid ($C_{18}H_{34}O_2$) and about 7 per cent. linoleic acid ($C_{18}H_{32}O_2$). According to the author's views, in most non-drying oils, in which oleïc acid has hitherto been considered the only liquid fatty acid, linoleic acid is also present.—Arch. d. Phar., Feb. 1889, 177.

Expressed Oil of Almond—Reactions and Commercial Quality.—George M. Beringer has examined different samples of expressed oil of almond. His results are given in comprehensive tables, as follows:

I. GRAVITIES AND PHYSICAL CHARACTERS.

	Sp. Gr.	Color.	Odor and Taste.
1	.9172	Pale yellow, nearly colorless	Bland, mild nutty.
2	.9195	Bright yellow	Very marked nutty flavor.
3	.91855	Very light yellow	Bland, mild nutty.
4	.9191	Light yellow	Bland, mild nutty.
5	.92195	Light yellow	Decidedly nutty.
6	.9165	Pale yellow	Bland, mild nutty.
7	.9207	Light yellow	Mild nutty.
8	.9198	Bright yellow	Decidedly nutty.
9	. . .	Pale yellow	Bland, faint nutty.
10	.9220	Light yellow	Faint nutty, bland.
11	.9186	Pale yellow, nearly colorless	Bland, hardly nutty.
12	.9181	Light yellow	Slight nutty, evidently expressed from moist almonds, as the odor of vol. oil is perceptible.
13	.9167	Yellow	Extracted from bitter almonds by petroleum ether, hardly nutty.
14	.9169	Yellow	Extracted from sweet almonds by petroleum ether, hardly nutty.

II. COLOR REACTIONS AND IODINE ABSORPTION.

Oil.	U. S. P. Test. 2 drops H_2SO_4 on 8 drops of oil.	Ger. Ph. Test. 15 parts of Oil, 2 parts H_2O, 3 parts HNO_3 Fuming.	⅓ vol. HNO_3 (1.42.)	HCl Sugar.	HCl 1.20.	Iodine Absorption.
No. 1.	Yellow, outer edge becoming green, on stirring grayish, almost colorless.	White mixture. In 24 hours oil almost solid white mass, acid liquid colorless.	White, acid colorless.	No change.	No change.	96.646
" 2.	Bright brown, turning to reddish brown, on stirring dirty olive brown.	Yellow mixture. In 24 hours oil in two layers, a partly congealed mass, and liquid layer on top, acid bright orange.	Greenish, turning to yellow, acid orange.	Red.	Green.	106.260
" 3.	Bright yellow, outer edge greenish, on stirring becoming gray, almost colorless.	White mixture. In 24 hours oil almost solid, acid liquid colorless.	White, acid colorless.	No change.	No change.	99.176
" 4.	Yellow, on stirring gray, almost colorless.	Peach blossom red. In 24 hours oil partly solidified, acid liquid colorless.	Peach red, acid colorless.	No change.	No change.	99.935
" 5.	Dark brown with black spots, outer edge green, stirring dark olive brown.	Mixture white. After 24 hours oil not solidified, yellow, acid yellow.	Greenish, changing to yellow, acid yellow.	Red.	Green.	106.766
" 6.	Bright orange, on stirring almost colorless.	Peach blossom red. In 24 hours oil almost entirely solidified, white, acid colorless.	Peach red, acid colorless.	No change.	No change.	98.417
" 7.	Brownish yellow, becoming green on outer margin and red through center, stirring dirty olive.	Reddish, changing to orange. In 24 hours oil yellow, not solidified, acid colorless.	Yellow, acid yellow.	Red.	Green.	106.480
" 8.	Dark red brown, on stirring an olive brown tint.	Orange mixture. In 24 hours oil yellow, not solidified, acid yellow.	Greenish, changing to yellow, acid yellow	Red.	Green.	109.802
" 9.	Yellow, outer edge greenish, stirring colorless.	Peach blossom red. In 24 hours oil solidified, acid liquid colorless.	Peach red, colorless.	No change.	No change.	93.989
" 10.	Yellow, becoming darker, on stirring light gray, with dark spots.	Yellow. In 24 hours oil yellow, not congealed, acid pale yellowish tint.	Orange red, acid colorless	Orange.	No change.	105.874
" 11.	Yellow, on stirring gray.	White mixture. In 24 hours oil solid, cream white acid, colorless.	White, acid colorless.	No change.	No change.	91.586
" 12.	Yellow, stirring almost colorless.	White mixture. In 24 hours almost solid, acid colorless.	White, acid colorless.	No change.	No change.	96.646
" 13.	Bitter almond, yellow, tinged with green on outer edge, on stirring grayish, yellow tint.	White mixture. In 24 hours solid, acid colorless.	White, acid colorless.	No change.	No change.	{97.152, 98.037} av'ge 97.594
" 14.	Sweet almond, yellow, on stirring bluish gray.	White mixture. In 24 hours almost solid, acid liquid colorless.	White, acid colorless.	No change.	No change.	{98.928, 96.646, 97.658} 97.744

As from the tests, numbers 1, 3 and 12 of the commercial samples are believed to be pure, and with numbers 13 and 14 prepared by the author showing a range of gravity from .9167 to .9185, it is believed that the officinal limit might be still further narrowed by fixing the gravity at .916 to .919 and usually about .918. Of the twelve commercial samples examined, three are believed to be pure, as already stated, three are apparently peach kernel oil, four are mixtures of sesame and arachis oils, one a mixture of almond and lard oils, and one a purified arachis oil.—Amer. Jour. Pharm., May 1889, 230–234.

Expressed Oil of Almonds—Improvement of Color.—Messrs. Schimmel & Co. call attention to the advantage that would result in the improved color of almond oil if a practical method of blanching the almonds could be introduced. It would be an indispensable condition that the almonds should not require to be moistened, because otherwise the formation of the essential oil of bitter almonds would be induced, and the fixed oil would acquire a strong bitter taste and contain a trace of hydrocyanic acid.—Pharm. Jour. and Trans., April 20, 1889, 842.

Castor Oil—Presence of Two Liquid Acid Constituents.—K. Hazura and A. Grüssner infer from their experiments that the liquid acid of castor oil is not a single compound as it has been hitherto supposed, but a mixture of two isomeric acids of the composition $C_{18}H_{34}O_3$, one of which, ricinoleic acid, yields on oxidation trioxystearic acid, whilst the other, ricinisoleic acid, yields isotrioxystearic acid. The proportion of these acids is about 1 of the former to 2 of the latter. As no dioxystearic acid has been obtained from the oxidation of the liquid acids of castor oil, it may be concluded that of all the fatty oils hitherto examined castor oil is the only one which contains no oleine.—Chem. News, April 12, 1889, 180; from Monit. Scient. Quesn., April 1889.

Croton Oil—Opinion that Buchheim's Crotonolic Acid is the Active Constituent. — Kobert attacks Senier's theory (see Proceedings 1884, 195–196) that there are two principles in croton oil—one a cathartic, and the other a vesicating body. He believes that both effects are due to Buchheim's "crotonolic acid" which exists in the oil partly as a glucoside, and may be prepared by treating the oil with a hot saturated aqueous solution of barium hydrate, whereby the fatty acids are precipitated. They are collected, well washed, dried, and the oleic and crotonolic salts dissolved out by ether. After evaporation the residue is treated with absolute alcohol, which dissolves out the barium crotonolate, and this is decomposed by sulphuric acid. The author denies that croton oil is separable by means of alcohol into the two portions mentioned by Senier, and states that the solubility of the oil depends mainly on its age, while some varieties are soluble in all proportions. Though crotonic acid itself is freely soluble in alcohol, the solubility of the oil

bears no relation to the quantity of free crotonolic acid present.—Amer. Drugg., Aug. 1888, 143; from Chem. Ztg.

Laurel Nut Oil—Chemical Examination.—David Hooper communicates the results of a chemical examination of the fixed oil of the seeds of *Calophyllum Inophyllum*, L., known commercially as "laurel-nut oil," which has hitherto not been investigated chemically. The oil has a greenish-yellow color, thick consistence, fragrant odor and bitter taste; begins to congeal at 19° C., is quite solid at 16°, and has the s. g. 0.9315. It has an acid reaction, 100 grams requiring 1.89 grams of caustic potash to neutralize. 100 grams of the oil required 19.6 grams of KHO to convert into soap, the saponification equivalent being 285.6. The volatile fatty acids obtained by Reichert's distillation process required 0.23 per cent. of KHO, calculated for the original oil. The insoluble fatty acids amounted to 90.85 per cent. Alcohol of 85 per cent. removed green coloring matter and odorous extract, having a bitter taste, and amounting to 7 per cent. The conclusion arrived at from the examination of the laurel-nut oil is that it cannot be regarded as a drying oil, nor altogether as non-drying, but must take up an intermediate position between the two. In endeavoring to classify this oil with those that have already been investigated, the task is not difficult. Most of the experiments exhibit in a very striking manner a strong relationship to those of the cotton-seed oil group. The saponification equivalent, the high melting point of the fatty acids and the free acids are very remarkable, and the sulphuric and nitric acid tests are particularly allied to those performed upon cotton-seed oil.—Pharm. Jour. and Trans, Jan. 5, 1889, 525–526.

Margosa Oil—Characters and Constituents.—C. J. H. Warden has prepared the fixed oil from the seeds of *Melia Azadirachta* (the "Nim" tree of India) as follows:

The fruit was washed to separate pulp, the stones dried, cracked, and the almonds exposed to a gentle heat for some time to remove moisture. The dried almonds were then crushed, placed in a cloth bag, and the oil expressed. It was found very necessary to first dry the almonds before subjecting them to pressure; without adopting this precaution a white, creamy fluid was obtained, instead of clear oil, from which it was subsequently impossible to separate the oil, except by ether or other solvent. The oil thus obtained was filtered through filter paper before it was examined. Directly after filtration the oil, when viewed in bulk, had a slight greenish coloration by transmitted light, owing to some of the almonds not having been quite ripe, and to solution of traces of chlorophyll in the oil. Viewed in a thin stratum, the color of the oil was yellowish. The oil possessed a powerful garlic-like odor, and was very bitter. The specific gravity at 15.5°C. was .9235; at about 10° to 7°C. the oil congeals, without losing its transparency. After standing for about thirty-six hours, the recently expressed oil deposited a white sedi-

ment, which examined microscopically was found to be amorphous. The color reactions of margosa oil were not characteristic. With concentrated sulphuric acid a rich brown color was yielded, and a strong garlic odor evolved. By Massie's test with nitric acid the oil became almost immediately of a reddish color; after standing about one hour and thirty minutes, the color was pale yellow. The elaidin reaction, conducted according to Pontet's directions, yielded a solid, firm yellowish product after eighteen hours, the temperature in the laboratory varying between 89° and 93°F. Exposed in a thin layer on a glass plate to a temperature of 100°C. for some days, the oil did not dry or become tacky. The oil was easily soluble in ether, chloroform, carbon bisulphide, benzol, etc. Absolute alcohol agitated with it was colored greenish; on separating the alcohol, and evaporating off the spirit, an extract was obtained, which consisted of oil, from which a small residue, whitish in color, separated on standing. The alcoholic extract was very bitter, and possessed in a marked degree the peculiar odor of the oil. The whitish residue deposited from the oil, separated by alcohol and examined microscopically, did not appear crystalline. Margosa oil after repeated agitation with alcohol was found to have lost its bitterness and almost wholly its alliaceous odor. By suitable treatment, which is described by the author, the following constituents of the oil were determined: soluble fatty acids, 3.519 per cent.; insoluble fatty acids, 89.128 per cent.; sulphur, 0.427 per cent.; a viscid, pale amber-colored, very bitter substance, containing sulphur, and having the properties of a neutral resin; a white alkaloidal substance, a neutral principle, and two acid resins. The oil yielded an acid distillate, which, when freed from lauric acid, required for saturation 4.6 c.c of decinormal soda solution for each 2.5 grams of oil employed. The percentage of caustic potash required for saponification was 19.72, the saponification equivalent being 284 by Koettslorfer's method.—Pharm. Jour. and Trans., Oct. 27, 1888, 325–326.

Chaulmugra Oil—Value as an External Remedy.—Th. Christy draws attention to the great strides that have been made with chaulmugra oil in England in regard to its application to open sores, wounds, sprains, and rheumatic complaints. It is now being extensively used in veterinary cases in some of the largest stables throughout the country, being especially useful in sores resulting from friction of the harness or from bruises, which horses traveling in the metropolis (London) are all more or less subject to. Following up the results obtained on horses, the oil has been successfully introduced as an ointment to be applied to open sores on cattle, dogs, cats, and other animals. It would seem to act by causing the wound to heal with great rapidity and cleanliness; furthermore, its use appears to keep off the flies that cause so much worry and damage. The properties of chaulmugra oil applied externally in bruises, sprains and stiffness, are well known to sportsmen and cyclists, while sufferers

from rheumatism, and stiffness of the joints attendant upon it, derive undoubted benefit from a good rubbing with it. Thanks to the demand now ruling for the oil, the pressers in India have been enabled to take steps to ship it in ton lots at about one-third the price which it used to cost. The English government has adopted it, and uses it in cavalry and artillery regiments. The German government has not yet decided to maké trials, but it is largely used by the officers.—Amer. Drugg., April 1889, 66.

Lanesin—A New Product.—Under the name of lanesin a product analogous to "lanolin" has been patented in Germany. The bleaching waters from wool are treated with lime, and the product with alkalies. The dried product is then treated with "appropriate solvents" which are evaporated, when the residuum is treated with the ethylic and methylic ethers of oleic or ricinic acid. A soft, smooth product is obtained, which does not become rancid, and is "applicable to pharmaceutic and cosmetic uses."—Arch. de Ph., September 5, 1888; Amer. Jour. Pharm., Oct. 1888, 512.

Lard—Adulteration with Cotton Seed Oil.—The September (1888) number of the "Analyst" contains communications on the above subject by A. H. Allen, Otto Hehner, Rowland Williams, E. W. T. Jones, W. F. K. Stock and Prof. J. Campbell Brown, which are condensed into one article in Amer. Jour. Pharm., (Nov. 1888, 573–578), by F. X. Moerk.

Lard—Detection of Cotton Seed Oil.—The practice of adulterating lard with cotton seed oil, which appears to have developed in the United States to an enormous extent, has elicited a paper from Michael Conroy, in which he communicates the result of experiments made with a view to determining a good test for its detection. The nitric acid test proposed some years since by Mr. Conroy for the detection of cotton seed oil in olive oil proved not quite satisfactory when applied to lard, and he prefers a modification of Milliau's test, dependent upon the reduction of silver nitrate. This consists in adding twenty grain measures of a test solution, containing five parts of silver nitrate and one part of nitric acid (sp. gr. 1.42) in one hundred parts of rectified spirit, to about one hundred grains of the lard previously melted at a water-bath temperature in a test-tube, and keeping the mixture in boiling water for five minutes. Pure lard remains perfectly white, but if adulterated with cotton seed oil the lard assumes a more or less olive-brown color, according to the amount of adulterant present, 1 per cent. causing a distinctly perceptible change.—Yearbook of Pharm., 1888, 368–376.

Butter—Method of Detecting Falsifications.—P. Bockainy proposes the following method for the detection of falsifications in butter. He melts the fatty matters to separate the water, decants upon a filter to remove

impurities, and pours 10 c. c. of the fatty matter kept dissolved on the water-bath into 20 c. c. of crystallizable benzene, adding then alcohol at 96.7° Gay Lussac, until a turbidity appears in the test-tube at the temperature of 18°. When the turbidity is very distinct the test tube is immersed in water at 12°. After the lapse of an hour the precipitate is formed and does not increase perceptibly. The test-tube is then taken out of the liquid and we note the number of c. c. of the lower stratum, observing also if this stratum is liquid, if it contains flocks of fatty matter, or if it is entirely flocculent. A pure butter never deposits more than 10 c. c. of the lower liquid stratum, and there are always, at the bottom and on the sides of the lower stratum, a few flocks. A butter which immediately deposits at 18° on the addition of at least 35 c. c. of alcohol, and yields a lower stratum at 12° of more than 10 c. c, is at once to be regarded as suspicious.—Chem. News, July 6, 1888, 12; from Bull. Soc. Chim., xlix, No. 4.

Oleum Theobromæ—Composition.—Paul Graf has determined the composition of oleum theobromæ. He finds it to contain small quantities of free fatty acids and cholesterin. The liberated fatty acids on distillation gave evidence of formic, acetic and butyric acids; oleic acid is present, and after its separation, arachic, stearic and lauric acids were isolated by fractional precipitations with magnesium and barium acetates. The determinations of glycerin gave as a mean 9.59 per cent. Melting-point determinations, made in an open tube, gave for specimens of various sources figures varying from 29.4 to 33.4° C., while those made in a closed tube gave, with one exception, a uniform melting point at 34.3°. Amr. Jour. Phar.—Arch. d. Pharm., Sept. 1888, 830–846.

Wax—Examination, etc.—According to Hübl white wax obtained from yellow wax by sun bleaching does not differ from this in composition; if, however, yellow wax be bleached by use of chemicals the product is altered considerably, so that it may even be pronounced adulterated by the analyst. Hübl finds that the ratio of *acidity* to the *compound ether* is as 1:3.7, and this has been confirmed by other investigators. The *acidity* represents the number of milligrams of KOH required to neutralize a warmed alcohol mixture containing 1 gm. wax; this figure should be between 19 and 21. The *compound ether* figure is obtained by boiling for one hour the above neutralized wax with excess of alcoholic KOH; the neutralized KOH, in milligrams, furnishes the figures, varying between 73 and 76. The *saponification* figure is the sum of the *acid* and *compound ether* figures, and should be between 92 and 97.

The following figures have been ascertained by Hübl for wax and some of the possible adulterants:

	Acidity.	Compound Ether.	Saponification.	Ratio.
Yellow wax	20.00	73.80	93.88	1:3.67
White " sun bleached	19.87	74.95	94.82	1:3.77
" " chemically, " I	22.02	76.15	98.17	1:3.45
" " " " II	24.00	74.56	98.56	1:3.10
Japan "	20.	200.	220.	1:10
Carnauba wax	4.	75.	79.	1:19
Tallow	4.	176.	180.	1:44
Stearic acid	195.	——	195.	——
Rosin	110.	1.6	112.6	1:.015
Paraffin	——	——	——	——
Ceresin	——	——	——	——

—Chem. Ztg., 1888, 1277; from Pharm. Ztsch. f. Russl., 1888, 579.

Japan Wax—Composition.—According to Eberhard, Japan wax is composed chiefly of palmitin, containing also small quantities of isobutyric and palmitic acids. The white coating which appears with age consists of palmitic acid.—Rdsch., 1888, 844.

CARBOHYDRATES.

Carbohydrates—Delicacy and Value of the Furfurol Reaction.—Dr. L. v. Udránszky considers the furfurol reactions the most delicate tests for the carbohydrates. H. Schipf uses a test paper made by immersing paper in a mixture of equal volumes of xylidin and glacial acetic acid diluted with alcohol, and drying. A small quantity of the substance to be tested is heated with a slight excess of concentrated sulphuric acid and the test paper held in the evolved vapors; a beautiful red color is produced owing to the formation of the furoxylidin. It will detect as little as 0.00007 gm. glucose in an aqueous solution. The author uses a furfurol reaction, even more delicate than the above, detecting 0.000028 gm. glucose in solution. One drop of a dilute solution to be tested is mixed with two drops of a 15 per cent. alcoholic solution of a-naphthol in a test tube, and ½ c.c. concentrated sulphuric acid is carefully poured in to form a distinct layer. If at the line of contact a *violet color* above a green layer is produced, carbohydrates are present. Urine is diluted with 9 volumes of water and *one drop* proceeded with as above If the violet color is not produced, the urine is considered normal; if the color is produced, the urine may be considered abnormal, because it yields a quantity of furfurol which is also obtained from a glucose solution containing at least 0.5 per cent. By means of these two tests carbohydrates were detected in all urines examined; albumen perfectly free from carbohydrates heated with concentrated acids formed furfurol which was recognized in the distillates, establishing for the first time by chemical reactions a close relationship between the albuminoids and the carbohydrates. In testing urine for carbohydrates, if albumen be present in larger quantities it must first be removed; small quantities do not introduce appreciable errors, owing

to the small quantity of urine taken. Fehling's solution under the most favorable conditions failed to detect less than 0.00012 gm. glucose in aqueous solution; testing urine by the three tests, the bodies other than carbohydrates decrease the delicacy of Fehling's test to a greater degree than the first two tests.—Amer. Jour. Pharm., Sept. 1888, 456–457; from Zeitschr. f. Phys. Chem., 1888.

Carbohydrates—Presence in Urine.—N. Wedenski, by precipitation with benzoyl chloride in the presence of NaOH, obtained the compound ethers of two carbohydrates, of which one was decomposed by boiling with excess of NaOH; the other was not acted upon by this reagent, but was afterward easily decomposed by boiling with dilute H_2SO_4. The former corresponds to the compound ether of the starch group, the latter to the glucose group. Fehling's solution is reduced by the latter, but only after treatment with dilute acids by the former; this also answers to the test for animal gum found by Landwehr in urine by precipitating with copper sulphate, washing, drying, dissolving in HCl, adding alcohol when the substance is reprecipitated, especially on warming to 60°. —Ztschr. f. Physiol. Chemie, xiii, 122.

Lignin—Determination in Flour.—Balland recommends the following method for determining lignin in flour: 25 grams of the flour are mixed in a porcelain capsule with 150 grams of a mixture of 1 p. fuming nitric acid and 19 p. of water, avoiding the formation of lumps as far as possible. After boiling for 20 minutes, during which the starch is completely converted, the mixture is thrown upon a plain filter, the residue on the filter well washed, carefully returned to the capsule, and boiled for 20 minutes with 100 grams of 10 per cent. solution of potassa. Filtration is again resorted to, and the residue on the filter—consisting of the insoluble lignin—is washed successively with hot water, strong alcohol and ether, then transferred and spread on a glass plate, dried and weighed. —Arch. d. Pharm., Aug. 1888, 751; from Jour. de Pharm. et de Chim., 1888, xvii, 600.

Starch—Selection of Kind for the Enemata and Suppositoria of the B. P.—Joseph Ince observes that the B. P. in directing *starch* for the preparation of enemata, suppositories, etc, the choice as to kind is left free to the dispenser. Three kinds of starch being at command, viz: wheat, maize, and rice starch, it is by no means indifferent which is employed. For making the mucilage entering the composition of enemata the rice starch is unsuitable; either wheat or maize starch, however, will make an excellent mucilage. On the other hand, in making the class of suppositories containing curd soap, the best starch to give them the proper consistence is rice starch, its firm granular texture rendering its use especially advantageous.—Pharm. Jour. and Trans., June 1, 1889, 969.

Potato Starch—Preparation and Comparative Examination.—Wm. A S. Johnson communicates an interesting account of the manufacture of

potato starch on Prince Edward Island, where there are ten factories with an annual output of about 2500 tons.

The potatoes, after being weighed, are dumped into a cellar, which is connected by means of a shoot with a revolving cylinder having a stream of water running through it. The bottom of this shoot, instead of being solid, consists of a number of small iron rods placed longitudinally, and about an inch apart, which allows the dirt, etc., to fall through. From the cylinder, the potatoes fall into a long inclined trough, full of water, which has beaters or paddles revolving in it. The last two of these are broad and flat, and after the potatoes have gone the full length of the trough and have been thoroughly washed, they are thrown by the flat paddles into a box having a cylinder about six feet long and twenty-two inches in diameter, covered with iron like a nutmeg grater, and turning at the rate of 700 revolutions a minute. This grates the potatoes, making them into a pulp, which is washed by a stream of water onto long sieves made of number 70 brass wire, which are kept in rapid motion. Over these is placed a long box with a bottom of zinc having three longitudinal lines of perforations, through which steady streams of water pour on the sieves, washing all the starch through, while the fibre, etc., is shaken off and washed away. The starch water is carried into a series of tanks about 10x12 feet, and 6 feet deep, where it is allowed to settle, which takes from seven to eight hours. The water is then drawn off, and the tanks are filled again. After the starch has all settled and the water run off a second time, the combined contents of the several tanks are shovelled into a larger one, which is about 28x15 feet, and 6 feet deep. This is then filled with clean water, and by means of a large beater the starch is stirred up and suspended in the liquid, giving it the appearance of milk, which is then pumped into tanks 24x12 feet, and about 5 feet deep, where it is again allowed to settle, taking about 15 hours. After the water has been drawn off, there is generally a superficial layer of about two inches, consisting of fibre, dirt, etc., which is shovelled out and thrown into a tank, to go through the process again, while the clear starch is thrown into a mill and ground to a fine powder, which is then put upon racks to dry. These drying racks consist of a number of layers (about 16) of narrow strips of wood about an inch wide, which are arranged in such a way that the starch in falling through is distributed equally over them. They are kept at a temperature of about 120° Fahr. by means of steam, and it takes about 20 hours to dry eight tons. When perfectly dry, the racks are tipped, and the starch falls into bags placed in suitable positions.

A comparative examination of this starch with six samples of commercial varieties purchased in the Philadelphia market, led to the following results:

	Ash.	Mo sture.	Soluble Matter.	Reaction.	Variety of Starch.
1	.275 per cent.	15.225 per cent.	.200 per cent.	Neutral.	Potato.
2	.432 per cent.	13.347 per cent.	.380 per cent.	Neutral.	Corn.
3	.439 per cent.	10.907 per cent.	.560 per cent.	Neutral.	Corn.
4	.641 per cent.	11.413 per cent.	.560 per cent.	Alkaline.	Corn.
5	.060 per cent.	12.452 per cent.	.200 per cent.	Alkaline.	Wheat.
6	.553 per cent.	. . . .	. . . .	. . . .	Corn.
7	.386 per cent.	. . . .	. . . .	. . . . .	Corn.

—Amer. Jour. Pharm., Dec. 1888, 595-598.

Dextrin—Process of Preparation.—According to Klepotschewsky, the best process for preparing dextrin is the following:

	Parts.
Potato Starch	400
Water	200
Hydrochloric Acid, sp. gr. 1.14	5

Mix them thoroughly, dry the mixture, by exposure to the air, during about two days, at a moderate temperature, then heat the mass, first on a water or steam-bath, and lastly for about half an hour in an oven at a temperature of 110° C.

Dextrin thus prepared leaves a slight residue behind; when it is dissolved in water, it slightly reduces Fehling's solution. But the same is the case also with dextrins made by other processes.—Amer. Drugg., May 1889, 86; from Chem. Zeit.

Tragacanth—Characters of the Water-soluble Portion.—The attention of Prof. John M. Maisch having been called to conflicting statements, in the "U. S. Pharm." and in the "Manual of Organic Materia Medica," respecting the precipitability of the soluble gum of tragacanth by alcohol, he has repeated an experiment made in former years, as follows: Some thin flakes of white tragacanth were washed with cold water, and then soaked in sufficient water without applying heat; cold water was then added from time to time with agitation, until the gelatinous mass remained sufficiently thin after standing for some time to permit the fluid portion to be separated by means of a wetted filter. On pouring some alcohol upon the clear filtrate, both layers remained clear also at the point of contact, and on mixing the two liquids, the transparency of the mixture was apparently not disturbed immediately; but on close examination the formation of a transparent jelly could easily be distinguished, and this separated after a while in the form of whitish flocks rising to the surface. The result corroborates that of experiments previously placed on record by others, and proves that a portion of tragacanth is soluble in cold water, and that this solution *is* precipitated by alcohol. In performing this experiment, it is necessary to avoid the use

of heat, since tragacanth always contains starch, which would be dissolved by hot water. The statement in the U. S. Pharm. that the water soluble portion of gum tragacanth *is not* precipitable by alcohol must therefore be corrected, this erroneous statement being also made in the Br. Pharm. of 1867.—Amer. Jour. Pharm., Feb. 1889, 72–74.

Sugars—Fermentability of Different Kinds.—W. E. Stone and B. Tollens have made experiments upon the relative fermentability of the various sugars. The power to undergo alcoholic fermentation is generally regarded to be characteristic of the true sugars, more particularly the glucoses, although this question has not yet been decided in several points. *Dextrose* and *levulose* are, as is well-known, readily fermentable, whilst *galactose* and *sorbose* are generally regarded as non-fermentable. The authors have now found that *galactose* will ferment in the presence of beer yeast and nutritive fluid almost as completely as dextrose, though slower. *Sorbose*, also, will undergo fermentation in the presence of beer yeast, though still slower and less completely; *arabinose* undergoes fermentation very slowly and incompletely, while milk-sugar undergoes such to a still less degree. The facility to undergo fermentation places these several sugars in the following order: dextrose, levulose, galactose, sorbose, arabinose, milk-sugar.—Arch. d. Pharm., March 1889, 277; from Liebig's Annal. d. Chem., vol. 249, 257.

Sugar—Determination in Liqueurs, Confectionery, etc.—F. Rathgen observes that the first test to be applied to a liqueur or an article of confectionery is to heat the aqueous solution with a little copper sulphate and soda-lye. If there is no precipitate or cuprous oxide, or but a slight one, we may polarize at once. In the presence of appreciable quantities of inverted sugar or glucose the inversion process of Clerget is recommended. Many kinds of confectionery require special procedures. The solutions must generally be decolorized with aluminium hydroxide and charred blood. In gum lozenges the sugar cannot be determined by a polaristrombometric process, since the optically active gum cannot be completely separated by means of alcohol. In "caramels" an accurate determination of saccharose is not practicable, as glucose is present to the extent of about 16 per cent.—Chem. News, Oct. 19, 1888, 197; from Zeitsch. f. Analyt. Chem., xxvii, No. 4.

Sugar—Simple Method of Detection in Urine.—Dr. Hager describes the following simple method for the detection of sugar in urine, which is particularly adapted for the use of physicians:

Take a strip of filter paper or of blotting paper about 3 cm. wide and of moderate thickness, and with a piece of wood or glass rod place a drop of urine on the paper. Then heat this over a kerosene lamp for a few minutes, so that neither the paper nor the spot of urine are changed by the heat, and that the paper does not get brown. This can be ac-

complished with certainty by having the flame not more than 3 mm. high, while the narrowest part of the chimney should be about 18 or 20 cm. above the flame, or project above it about a hand's span. The paper with the spot of urine should then be held about 2.5 cm. above the opening of the chimney, the side on which the spot is, being held toward the lamp. If the chimney is shorter, reaching only about 15 cm. above the flame, the paper should be held about 3.5 to 4 cm. above the mouth of the chimney. If the urine contains no sugar it leaves on drying either a scarcely perceptible or faintly yellowish spot. If it contains albumen the spot left is from a yellowish to a pronounced yellow color, and in the latter case frequently with a reddish tinge. If the urine contains sugar (dextrose) the spot is a brownish yellow, yellowish brown, or a brown color, according to the quantity of sugar present. On observing the spot through a magnifying glass by transmitted light (either sun or lamp light) it will be seen that the edge of the spot is darker with dark spots, while normal urine or urine containing only albumen is either free from these dark spots, or they are scarcely discernible. It is necessary for one to carry out this process several times in order to obtain the requisite practice. If no diabetic urine is obtainable, a substitute may be prepared by adding to about 12 c.c. of normal urine, 5 to 7 drops of syrup of dextrose, or 1 c.c. of honey which has been previously washed with absolute alcohol.—Drugg. Circ., April 1889, 78; from Pharm. Ztg.

Sugar—Detection in Urine.—Marson determines sugar in urine as follows: He adds to 8 c.c. of the sample 0.1 gm. ferrous sulphate, heats, adds 0.25 gm. potassa, and goes on heating for some minutes. If sugar is present the precipitate varies from dark green to black, and the supernatant liquid is more or less colored. In a normal sample the precipitate is a greenish-brown and the supernatant liquid is colorless.—Chem. News, Aug. 31, 1888, 109; from Zeitschr. f. Anal. Chem., xxvii, Part 2.

Sugars Contained in Quince and Salep Mucilage.—R. Gans and B. Tollens have found quince mucilage to contain arabinose or wood-sugar, or bodies closely allied to these, but neither dextrose nor levulose. In salep mucilage they found dextrose and probably also mannose, but neither galactose nor arabinose.—Arch. d. Pharm., March 1889, 277; from Liebig's Annal. d. Chem., vol. 249.

Sugar—Nylander's Test.—According to "Pharm. Post" (1888, 427), Nylander's sugar test, which is composed of 2 gm. bismuth subnitrate, 4 gm. rochelle salt, and 100 gm. of an 8 per cent. solution of soda, possesses the advantages of easy preparation, of stability, and of delicacy, 0.025 per cent. of sugar being still detected.

Glucose—Improvement in the Manufacture of High Grades.—Commercial glucose usually consists of about 66 per cent. of fermentable sugar, 18 to 20 per cent. of unfermentable organic constituents, the rest

being water. The low percentage of dextrose has hitherto prevented its practical employment in many branches of industry. This drawback is likely to be overcome by the improved process for preparing grape-sugar, devised by Alfred Seyberlich, of Riga. One of the main improvements in this process is the use of nitric in place of sulphuric or other acids. Nitric acid had, indeed, been already recommended by others, but no practical results appear to have been attained by them. The new process is carried on in open boilers without pressure. The relative proportions of ingredients are:

Starch	100 parts
Water	200 "
Nitric Acid	½ per cent.

of the starch (from rice, Indian corn, etc., etc.) calculated as air-dry. These ingredients are boiled in the usual manner, the liquid then neutralized, rendered faintly alkaline, and filtered by means of a filter-press. The resulting filtrate is evaporated to a density of 35° B. (taken while hot), and transferred at a temperature of 18° C. (65° F.) to copper pans, where it is frequently stirred and allowed to crystallize. The crystalline mass is pressed in coarse linen bags, yielding cakes which contain about 88 per cent. of pure sugar, 10 p. c. of water, and 2 p. c. of impurities. This is "raw sugar." The clear syrup, which has been removed by pressing, is repeatedly concentrated, so as to obtain more crystals, and the final molasses freed from nitric acid and salts by means of sulphurous acid. For the purpose of refining the raw sugar, the cakes are melted in a copper boiler, with the addition of enough water to make a solution of the density of 32° B. (while hot). For every 100 parts of sugar 10 parts of animal charcoal are then added, the whole well stirred and heated to 80° or 90° C., and afterwards passed through the filter-press. The resulting colorless syrup is set aside to crystallize, yielding a brilliant white crystalline mass, which is freed from mother-water by pressure. The latter is again concentrated and a fresh crop of crystals obtained. If the sugar thus refined and pressed is crushed or ground, the product will form a salable, white, crystalline "farina-sugar." To obtain larger and better developed crystals, the cakes are melted on a water-bath at 80° to 90° C., the melted mass poured into the usual forms, and allowed to crystallize during 48 hours at 18° C. When the mass is dry it represents *pure hydrous* glucose, containing 90 per cent. of dextrose and 10 per cent. of water. Anhydrous, or practically anhydrous glucose is prepared by melting the hydrous cakes over an open fire to boiling, cooling, adding a few crystals of anhydrous grape sugar, and allowing to stand 24 hours. The resulting crystals contain 98 per cent. of glucose and 2 per cent. of water. By crushing and sifting this, a product is obtained which is very similar to cane-sugar. The author states that 100 parts of

anhydrous starch will yield from 95 to 100 parts of glucose.—Amer. Drugg., May 1889, 88; from Dingler's Pol. J., vol. 271, 512.

Glucose—Review of Processes of Determination.—Dr. Charles O. Curtman critically reviews the different processes that have been proposed and are in use for the determination of glucose, which may be consulted in Pharm. Rundschau, Feb. 1889, 29–33.

Glucose—Detection in Urine, etc., by Safranin.—L. Crismer finds that a solution of safranin (1:1000) serves an excellent purpose for the detection of glucose in urine, in foods, and of glucosides (after boiling with mineral acids). The manner of testing urine is to take 1 c.c. urine, 5 c.c. safranin solution, 2 c.c. solution of soda, and heat to the boiling point; if decolorization takes place the urine is abnormal. From a number of experiments the author comes to the conclusion that all normal urine contains small quantities of carbohydrates, but the amount is not sufficient to decolorize the above quantity of safranin solution. Uric acid, kreatin, chloral, chloroform, hydrogen peroxide, and hydroxylamin salts, which reduce Fehling's solution, will not decolorize this test solution. Albumen, however, decolorizes it completely, but *very slowly.*—Pharm. Ztg., 1888, 651.

Glucose — Value of the Safranin-Test for Its Presence in Urine. — Prof. Chas. O. Curtman has found the safranin-test, proposed by Louis Crismer, to be very reliable for the detection of abnormal glucose in urine. He has never found a normal urine of which 1 c.c. discolors more than 2 c.c. of the test solution. The latter consists of a 0.1 per cent. solution of safranin in water, and the test is made by heating 5 c.c. of this liquid and 2 c.c. caustic soda solution with 1 c.c. of urine. If the mixture is decolorized, glucose is present in abnormal quantities.—Pharm. Rundschau, June 1889, 132.

Glucose—Modification of Its Determination by Fehling's Solution.—H. Causse observes that the separation of cuprous oxide in the course of the determination of glucose by Fehling's solution causes considerable annoyance during the latter stage of the process, and also obscures the final disappearance of the blue color of the liquid. The author finds a remedy for this in the addition of ferrocyanide of potassium to the alkaline copper solution, this substance having no effect upon the solution either in the cold or when boiled. The modified Fehling's solution is made by adding to 10 c.c. of that prepared as advised by Méhn, 20 c.c. distilled water and 4 c.c. of solution of ferrocyanide of potassium (1:20). When this is heated to boiling, each drop of sugar solution added at once produces a distinct precipitate of cuprous oxide, which in its turn is immediately redissolved, the blue color being decreased in proportion to the addition of the sugar solution, until eventually it disappears entirely. Upon removing the now clear, colorless solution from the fire, it becomes browned,

and colorless crystals are deposited.—Arch. d. Pharm., May 1889, 475; from Jour. de Pharm. et de Chim., 1889, xix, 171.

Glucose—Preliminary Determination in Urine.—Dr. H. Hager finds that for the preliminary determination of sugar in urine the use of the alkaline bismuth solution is the most reliable. Having removed any albumen that may be present, by acidulating the urine with acetic acid, boiling, and filtering, 1 c.c. of the reagent is added to 6 c.c. of the urine, and the mixture is boiled, when, in the presence of sugar, a black color is produced, due to the reduction of the bismuth. The reagent is made by dissolving 10 p. subnitrate of bismuth and 10 p. tartaric acid in 50 parts of water, with the aid of sufficient potassa solution to effect a clear solution, then diluting this with an equal volume of water. In the absence of this reagent, R. Böttger's method may be substituted—6 to 8 c.c. of the urine being shaken with 2 c.c. of sodium carbonate solution and a very small quantity of subnitrate of bismuth, and the mixture boiled.—Arch. d. Pharm., Feb. 1889, 127; from Pharm. Ztg., 33, 744.

Glycogen—Occurrence in Diabetic Urine.—Prof. Leube, while unable to detect glycogen in healthy urine, or in urine from persons suffering with *diabetes insipidus*, detected this substance in a case of *diabetes mellitus*, as follows: The urine was passed direct into absolute alcohol, the precipitate collected, dried, dissolved in water, reprecipitated in alcohol, and this repeated until the aqueous extract was free from sugar. The glycogen was then determined as such by iodide of potassium, as well as by its conversion into sugar by boiling with sulphuric acid, etc.—Arch. d. Pharm., Feb. 1889, 130; from Münch. Med. Wochensch., 1888, 24.

Levulose—Preparation.—M. König and L. Jesse have obtained levulose in quantities by the following method: From a weighed quantity of pure *inulin* an 18 to 20 per cent. solution was prepared by the aid of a ½ per cent. sulphuric acid; the solution was digested on a water-bath at a boiling temperature for one hour, filtered, and the filtrate concentrated to syrup at a moderate temperature on the water-bath. The faintly yellow syrup so obtained, was placed over sulphuric acid in a vacuum for two or three days, when, on addition of a few crystals of pure levulose, the viscid syrup soon congealed to a solid crystalline mass. The levulose so obtained is not anhydrous, its composition being $2C_6H_{12}O_6+H_2O$. To obtain anhydrous levulose, the viscid syrup, or the mass of crystals, is dissolved in commercial absolute alcohol by heat, with a reverse condenser, the solution is allowed to stand 24 hours, decanted clear, and a few crystals of pure fruit sugar are added, when anhydrous levulose will crystallize out after a few days' standing. Its s. g. is 1.6691 at 17.5° C.—Arch. d. Phar., Oct. 1888, 947; from Monatsh. f. Chem., 9, 562.

Levulose—Superficial Absorption of Water by the Anhydrous Sugar.—Messrs. Jungfleisch and Grimbert have observed that perfectly anhydrous levulose, crystallized from absolute alcohol, becomes superficially coated when exposed to air with microcrystalline levulose containing one equivalent of water, and that this coating protects the interior anhydrous portion from further hydration, the total absorption of water being quite insignificant. If, on the other hand, the anhydrous levulose is moistened direct with a suitable quantity of water, the entire substance is converted into the crystallized hydrate, but even after continuous exposure under the air-pump the amount of water absorbed is no more and no less than 1 equivalent. With this it does not again part at the ordinary temperature, and even at 100° it parts with water very slowly—about 0.2 per cent. per hour—the substance itself being at the same time decomposed, as is evidenced by its becoming darker, and losing its rotatory power.—Arch. d. Pharm., Nov. 1888, 1038; from Jour. de Pharm. et de Chim., 1888, xviii, 193.

Dextrose—Identification by its Conversion into Saccharic Acid.—R. Gans and B. Tollens have determined that saccharic acid is the specific product of the oxidation of dextrose, and that the formation of this acid is necessary for its absolute identification. Formerly the production of cuprous oxide by the application of Fehling's test was deemed sufficient to establish the presence of "grape-sugar" in a vegetable substance. It has now, however, become necessary to determine absolutely the presence of a true carbohydrate, since Tollens has shown that all true carbohydrates form *levulinic acid* by heating with hydrochloric acid. In a similar manner, by oxidation with nitric acid, galactose yields *mucic acid* as characteristic product. The authors have, furthermore, found that by oxidizing

Raffinose some saccharic acid is produced, thus proving the presence in raffinose of dextrose. Raffinose they find to be composed of galactose, levulose and dextrose.—Arch. d. Pharm., March 1889, 277; from Liebig's Annal. d. Chem., vol. 249, p. 215.

Milk Sugar—Method of Effecting Solutions.—G. B. Schmidt finds that a saturated aqueous solution of milk-sugar in water of 15° C. (59° F.) cannot be produced by agitation or trituration of the solid and liquid during a short time, as is the case with many other soluble solids. During the first half-hour, the solubility will be only 1 in 11.8; after four hours, it will be 1 in 8.6; after eight hours, 1 in 7.5; and after twenty-four hours, 1 in 6.3. The author recommends to use this length of time and water at 15° C. to prepare normal solution of milk sugar, when no other directions are given. By continuing the maceration and shaking longer, the rate of solubility increases, so that after 12 days it becomes 1 in 5. But for uniformity's sake, the author prefers 24 hours and 15° C. —Amer. Drugg., Feb. 1889, 36; from Maandblad voor Apoth., 1888, 167.

Milk Sugar—Products of Oxidation.—The oxidation products of milk sugar that have hitherto been obtained by the action of nitric acid, of halogens and other agents, contain at the most six atoms of carbon. Emil Fischer and J. Meyer have now found that when milk sugar is carefully oxidized by means of bromine water, a new acid—

Lactobionic Acid ($C_{12}H_{22}O_{12}$), is obtained, this containing all of the carbon contained in the milk sugar. Lactobionic acid constitutes a colorless, strongly acid syrup, which readily decomposes carbonates, is easily soluble in water, difficultly soluble in alcohol and glacial acetic acid, and insoluble in ether. The pure acid does not reduce alkaline copper solutions; but if heated for a short time with dilute mineral acids, it acquires strong reducing power, owing to its being split up into galactose and gluconic acid.—Arch. d. Pharm., April 1889, 368; from Ber. d. D. Chem. Ges., 1889, 361.

Milk Sugar—Detection of Traces of Glucose.—H. Will, to detect even traces of glucose in milk sugar, agitates for one minute 10 grams powdered milk sugar with 20 c.c. dilute alcohol, filters and heats to the boiling point, for a few seconds, 5 c.c. of the filtrate with 5 c.c. of a solution made from 7 grams cupric acetate, 87 c.c. water, and 3.2 c.c. dilute acetic acid; the test in *absence* of glucose remains clear on cooling, and after one hour's standing should show no deposit of cuprous oxide.—Apoth. Ztg., 1889, 324.

Galactose—Action of Ferments.—There being considerable diversity of opinion as to the fermentability of galactose, which is, as is known, produced from milk sugar by boiling with dilute acids, Bourquelot has made systematic experiments with a view to deciding the question. He finds that when pure galactose is subjected to the action of beer yeast at 15° not a trace of fermentive action results; but if to the galactose solution small quantities of glucose, levulose or maltose are added, the fermentation not alone extends to these, but the galactose also undergoes fermentation. The influence of their presence is, however, not identical, the presence of glucose inciting fermentation more rapidly in galactose solutions than either of the others; maltose having the weakest effect. It is established by the author's experiments, also, that in the presence of glucose, etc., the fermentation does not begin with the glucose, and when established carries it over to the galactose. On the contrary the two substances undergo fermentation simultaneously from the beginning. The author's observations explain why galactose has hitherto been regarded as directly fermentable, since during its preparation from milk sugar by dilute acids a certain proportion of glucose is always produced.—Arch. d. Pharm., Dec. 1888, 1132; from Jour. de Pharm. et de Chim., 1888, xviii, 337.

Seminose—A New Sugar.—R. Reiss describes under the name of semi-

nose a new sugar obtained from the layers of cellulose deposited as reserve material in different seeds. While the new sugar has not yet been obtained in crystalline condition, the author has obtained several crystallized and characteristic compounds, which leave no doubt that the substance is a new kind of sugar not hitherto described. As obtained it constitutes a perfectly clear, faint yellow, sweet syrup, having a pleasant bitter after-taste. It has been obtained from seeds of the Palmaceæ, Liliaceæ, Iridaceæ, Loganiaceæ, and Rubiaceæ.—Arch. d. Pharm., May 1889, 462; from Ber. d. D. Chem. Ges., 1889, 609.

Mannose—Formation and Characters.—According to E. Fischer and J. Hirschberger, mannose ($C_6H_{12}O_6$) is produced by oxidizing mannit with dilute nitric acid, and by the action of nascent hydrogen it is again converted into mannit. Mannose is precipitated by ether in the form of white flakes, which when allowed to stand for some time in contact with absolute alcohol are converted into a colorless friable mass, which keeps well in the exsiccator, but, being very hygroscopic, soon liquefies on exposure to air.—Arch. d. Pharm., April 1889, 369; from Ber. d. D. Chem. Ges., 1889, 365.

Mannit anhydride—Compound with Oil of Bitter Almonds.—According to Meunier, mannit-anhydride has the property of forming a solid compound with oil of bitter almond, as well as with the aldehydes in general. To prepare the mannit-anhydride, 10 grams of mannit are heated in a current of hydrochloric acid gas with 20 grams of absolute alcohol and 5 grams of fused chloride of zinc. The gas is abundantly absorbed under evolution of considerable heat. After allowing the mixture to stand several days, the liquid, containing the mannit anhydride, is decanted from any unchanged mannit, and yields, on addition of one-fifth oil of bitter almond, an abundance of needle-shaped crystals. These, when recrystallized from benzin and washed with alcohol, are colorless, melt at 207°, are readily decomposed at a higher temperature. They have the composition $C_6H_8O_4(C_7H_6O)_2$—Arch. d. Pharm., Nov. 1888, 1043; from Jour. de Pharm. et de Chim., 1888, xviii., 220.

ORGANIC ACIDS.

Vegetable Acids—Reactions with Chromic Acid and Permanganate.—Th. Salzer finds that while the oxidation of citric and tartaric acids by chromic acid takes place easily, as is stated in text-books, the reaction at ordinary temperatures differs so greatly that it affords a ready means of distinguishing between the two acids. In the case of citric acid it is extremely slow, while in the presence of tartaric acid a solution of chromic acid is discolored very rapidly, so that if the reaction is extended to several hours the presence or absence of 0.5 per cent. tartaric in citric acid may be determined. Formic, acetic, benzoic and succinic acid have no action on chromic acid. Alkaline permanganate solution is also discol-

ored by tartaric acid far more rapidly than by citric.—Arch. d. Pharm., Aug. 1888, 744; from Ber. d. D. Chem. Ges., 21, 1910.

Oxalic Acid—A By-product in Aniline Manufacture.—Dr. R. Hirsch states that the acid which has served for the nitration of benzenes and toluenes contains from ½ to 1½ per cent. of nitric acid. If allowed to stand for some time it deposits crystals of oxalic acid, formed at the expense of the carbide nitrated and of the *nitrous* acid. Hence it is necessary, in producing aniline, to use benzenes as free as possible from thiophenes, and nitric acid free from nitrous vapors.—Chem. News, Feb. 15, 1889. 84; from Chem. Ztg.

Oxalic Acid—Estimation in Plants.—Berthelot and André have recently shown that the precipitates which are obtained in vegetable extracts acidulated with acetic acid, by means of calcium salts, are not necessarily oxalate of calcium, but may contain tartrate, urate, citrate and sulphate of calcium, as also coagulated nitrogenous substances, and may not contain any oxalate at all. The separation of oxalic acid to the exclusion of these substances, is accomplished by the authors as follows: The vegetable extract or solution, either purely aqueous or prepared with addition of hydrochloric acid, and free from any particles of the plant, is raised to boiling, and the liquid then filtered. The filtrate is mixed with excess of ammonia, which causes a precipitate of impure oxalate of calcium, more or less colored, and mixed with flocculent substances. Next an excess of boric acid is added, which causes, if chloride of ammonium is present at the same time (and this should be added, if none is present), the resolution of other calcium salts except the oxalate, or prevents their precipitation. The mixture is now strongly acidulated with acetic acid, whereby carbonates and certain other salts are dissolved, and acetate of calcium is then added. The whole is heated during one hour, but not boiled, the object being to cause the precipitate to settle more compactly. It is then collected on a filter, washed and purified by resolution in hydrochloric acid, precipitation with ammonia, and acidulation of the liquid with acetic acid; this process of purification being repeated several times if necessary. The oxalate of calcium is thus obtained pure, and may be weighed as such.—Amer. Drugg., July 1888, 124; from Zeitschr. Anal. Chem., 1888, 403.

Succinimide of Mercury—A New Compound.—This new mercurial has the formula C_2H_4,CO,CO,NH, and it may be formed by heating together succinic acid, carbonic anhydride and ammonia. It furnishes with mercuric oxide a compound which occurs as a white silky powder, soluble in water. This solution remains quite unchanged when kept. Dr. Vollert publishes some account of the agent in the *Therapeut. Monatshefte*. He prepared a solution of 1.3 grams of the mercuric salt in 100 of water, and used it in a large number of cases in the form of a hypodermic injection. He found that its action was satisfactory, free from pain and from unde-

sirable secondary symptoms. Over some similar compounds it exhibits the advantage of giving a permanent solution which may be kept without decomposition for weeks. Moreover, it is cheap; it contains about half its weight of mercury in a combined condition.—Amer. Drugg., Jan. 1889, 13; from Chem. and Drugg.

Lactic Acid—Value in Diarrhœa of Tuberculous Patients.—Drs. Ségary and Aune have successfully used lactic acid against the diarrhœa of tuberculous patients, the stools becoming natural in a few days. They commenced with 2 gm. in a glassful of water, giving frequently in small doses during 24 hours; if necessary the quantity is increased to 6 or 8 gm. a day, and a little chlorodyne may be added.—Amer. Jour. Pharm., April 1889, 183; from "Lyon Méd."

Formate of Soda—Use as a Reducing Agent.—According to F. Nelissen, formate of soda constitutes a very useful reagent in blow-pipe analyses. At a high temperature this salt is decomposed with elimination of gaseous products which are powerful reducing agents, so that lead, copper, bismuth, silver and antimony, are reduced to metallic globules even in the oxidation flame of the blow-pipe. The reduction of tin is also accomplished with advantage by this salt; the sample is mixed with a larger quantity of the formate, heated to melting at first in the reduction flame, and then strongly in the oxidation flame.—Arch. d. Pharm., Jan. 1889, 34; from Zeitschr. f. Anal. Chem.

Acetone—Detection in Urine.—The following method for the detection of acetone in urine is given in "Bull. de la Soc. de Pharm. de Bordeaux:" Add to the urine a few drops of a concentrated solution of nitroprussiate of soda, and make the solution alkaline by adding potash. A red coloration appears and then goes off; add acetic acid, and, if acetone be present, we get a dark violet color. To find diacetic acid, perchloride of iron is used; it gives a dark-red color. Urine containing thalline, antipyrine and salicylic or phenic acid gives the same reaction with perchloride of iron, but with diacetic acid the color disappears on boiling. If urine be boiled before adding the perchloride of iron, the reaction does not take place in the case of diacetic acid, but occurs as usual with the other substances. Urine should be subjected to analysis as soon as possible, lest the diacetic acid decompose into acetone and carbonic acid.—Amer. Jour. Pharm., April 1889, 175; from Nouv. Rem., Feb. 1889.

Dioxyethylic Acetone—Characters.—E. Grimaux and L. Lefévre have studied the character of dioxyethylic acetone, $C_7H_{14}O_3$. It is a colorless liquid of an aromatic odor, which distils at 195°. Its specific density is 0.980 at 17.8°. Its vapor density is 4.95, the theoretic figure being 5.05. It is soluble in alcohol and ether, moderately soluble in water, and volatilizes along with watery vapor. It reduces the cupro-potassic liquor

energetically, and in heat it reduces ammoniacal silver nitrate, yielding a mirror. It restores the color of magenta which has been decolorized by sulphurous acid. It represents a mixed function, which has no analogues, being at once an acetone and the ethyl-ether of a bi-primary glycol.—Chem. News, Feb. 1889, 72; from Bull. Soc. Chim, 1889, No. 1.

Acetic Acid—Quick Method for its Determination in Acetates.—A. Sonnenschein recommends the following quick method for determining the acetic acid in acetates. He takes 5 grams of the sample, dissolves in water in a beaker with the aid of heat, and makes up in a flask to 250 c.c. If carbonaceous matter is present, it is filtered off before making up; 50 c.c. of the clear liquid are mixed with three drops of phenacetoline in a porcelain capsule. If a red color is produced, it is titrated with hydrochloric acid until it turns to a yellow. The acid consumed is calculated as sodium carbonate. Two drops of methyl-orange are next added, titrating until redness appears. The acid consumed is calculated as acetic acid or sodium acetate. Acetate of lime gives a colored solution, and must be treated with carbonic acid, boiled with animal charcoal, filtered, and made up to a known volume.—Chem. News, Aug. 3, 1888, 60; from Zeitschr. f. Analyt. Chem., xxvii, part 1.

Wine Vinegar—Characters that may serve for its Identification.—As the result of comprehensive experiments, H. Eckenroth concludes that there exist no absolute characteristics by which wine-vinegar may be identified as such, any more than such exist for the identification of true grape-wine. Nevertheless, if a vinegar corresponds to the following characters, contains besides some tartar and phosphates, and has an odor and taste resembling that of wine, there exists no reason why it should not be accepted to be wine-vinegar. The author found the s. g. of pure wine-vinegar to fluctuate between 1.0116 and 1.0147; it generally contains no alcohol, or only traces; the amount of extract fluctuates between 0.35 and 1.51 per cent., and it has a pleasant, aromatic odor, reminding of the extract from wine, and a sweetish-acidulous taste. It contains only traces of glycerin, a constant quantity not being present as maintained by some experimenters. Good wine-vinegar will contain about 6 per cent. of acetic acid; the total ash rarely amounts to more than 0.25 per cent., and always contains phosphoric acid. To determine the cream of tartar which wine-vinegar invariably contains, it is necessary to evaporate at least ½ to 1 litre of the vinegar. Besides the phosphoric acid, the ash contains chlorine, sulphuric acid, potassa, soda, lime, magnesia, etc.—Arch. d. Pharm., Feb. 1889, 127–128; from Pharm. Ztg., 34, 14.

Aluminium Acetate—Resolvent Powers.—According to Dr. Grosch aluminium acetate, in addition to its antiseptic property, has also resolvent powers, and has been used by him in the abortive treatment of fur-

uncles, the irrigation being made with a 20 per cent. solution—Amer. Jour. Pharm., March 1889, 125; from Berl. Klin. Woch., 1888.

Aluminium Acetate—Use as a precipitant of *Tea Tannin*, which see.

Hippuric and *Benzoic Acids*—Differential reactions with *Hypobromite of Sodium*, which see under "Inorganic Chemistry."

Benzoic Acid—Convenient Method and Apparatus for Its Sublimation from Benzoin.—A. Starting observes that much of the so called benzoic acid from Siam benzoin of commerce is really the artificial acid, which has been sublimed with Siam benzoin, and therefore, recommends that the true sublimed benzoic acid be prepared by pharmacists. A convenient apparatus, such as is used by the author, is constructed as follows: A box 2¾ feet in length, 1 foot wide and 1 foot deep, is coated on its inner surface with glazed paper, while the cover and joints are also carefully covered with paper. It is provided on the bottom with a circular opening into which a small brass or copper subliming vessel fits accurately, such vessel being conveniently about 3 inches in diameter and 2 inches deep. A circular sheet of pasteboard is suspended inside of box, about 2 to 3 inches above the subliming vessel, to prevent any of the sublimed benzoic acid from falling back into the subliming vessel. Then, about 35 grams of Siam benzoin, in powder, having been placed into the subliming vessel, this is pressed to the depth of about ½ inch into the opening of the box, and heat is applied by means of a small alcohol lamp during 4 hours, when it is removed, the black porous residue scraped out, and a fresh quantity of benzoin subjected to sublimation as before. The process may be repeated quite often (14 repetitions were made by the au hor) before the acid need be removed. Each sublimation requires about 70 grams of alcohol for the heating. The author thus obtained about 25 per cent. of pure sublimed benzoic acid, which was nearly white, having but a faint tinge of yellow.—Arch. d. Pharm., May, 1889, 410–411.

Mercuric Benzoate—A New Medicinal Compound.—Stukowenkow warmly recommends mercuric benzoate ($Hg(C_6H_5COO)_2+H_2O$), obtained by double decomposition between an alkaline benzoate and a mercuric salt, for the treatment of syphilitic diseases. It constitutes a white, crystalline, odorless and tasteless powder, which is sparingly soluble in water, but easily in alcohol as well as in aqueous solutions of chloride of sodium, the latter effect being due to its property of forming easily soluble double salts, with halloid salts. It is used for urethral injections in solutions of 1:1000 to 2000, an equal quantity of chloride of sodium. For subcutaneous injections it is employed in conjunction with cocaine, the following being the proportions: Hydrargyri benzoici, 0.2 to 0.3; aquæ dest., 40.0; natrii chlor., 0.1; cocaini hydrochlor., 0.15.—Arch. d. Pharm., April 1889, 318; from Pharm., Zeitschr. f. Russl., 28, 90.

Saccharin—Review of its Source, Character and Uses.—Oscar Lowman contributes a paper on saccharin in which he reviews the method of its production, chemical constitution and character, and the uses to which it has been or may be applied.—See Pharm. Era, Dec. 1888, 462, 463.

Saccharin—Soluble Modification.—P. Mercier recommends the following method for obtaining a soluble modification of saccharin, the sparing solubility of the normal compound being a great objection to its use: 10 parts of saccharin, mixed with water, are treated with 4 to 5 parts of bicarbonate of sodium in small portions at a time, about half an hour being allowed to pass between each addition, and the mixture being stirred occasionally to hasten the combination and the evolution of carbonic acid. It is important to cease adding bicarbonate before the saccharin is completely saturated. This operation requires 10 to 15 hours. Next 20 parts of 95 per cent. alcohol are added to the mixture, whereby most of the *sodium saccharinate* is precipitated, the excess of saccharin and impurities remaining in solution. The magma is collected on a vacuum filter and completely washed, first with more alcohol, and finally with sulphuric ether. On drying in the air, a white, exceedingly sweet, and soluble crystalline powder is obtained, which possesses all the properties of saccharin.—Amer. Drugg., July 1888, 124; from Chem. and Drugg.

Saccharin—A New Closely Allied Compound.—Another compound, closely allied to saccharin, having an intensely sweet taste, is described by Dr. Noyes. This compound is

Para amidobenzolsulphinid, having the constitution that may be represented by the formula:

$$C_6H_3\left\{\begin{array}{l} CO \searrow \\ SO_2 \nearrow \\ NH_2 \end{array}\right. NH_2$$

The compound may also be described as being a "saccharin" in which an atom of hydrogen is replaced by NH_2. It is difficultly soluble in water, and a hot saturated solution shows a deep fluorescence.—Amer. Drugg., Feb. 1889, 36; from Amer. Chem. Jour., viii, 167.

Saccharin—Test.—In a former paper David Linde had communicated a test for Fahlberg's saccharin, which he has since found can be modified to advantage as follows: After placing the saccharin with concentrated nitric acid in a small porcelain dish, evaporate to dryness on the water-bath, or by moving the flame of a spirit-lamp to and fro under the dish, blowing on the surface occasionally to facilitate evaporation, and taking care that the heat does not rise too high. If the dish is allowed to cool and a few drops of strong solution of potash in 50 per cent. alcohol are added to the residue, a faint yellow color only will be developed. Spread the liquid over the surface of the dish, and before it has settled to the bottom, apply heat with the lamp, as above, quickly

all over the under surface of the dish. If the vapor of alcohol happens to ignite it must at once be extinguished. A greater variety of colors will develop in this way than by following the directions formerly given. As the dish cools and moisture is absorbed, the colors fade; by heating they can be reproduced, but not in the same perfection as at first.—Chem. News, Sept. 28, 1888, 155.

Saccharin—Presence in Glucose.—Lepine stated at the Paris *Conseil de Hygiène* that certain manufacturers have placed upon the market solid glucose and glucose syrups, containing from 1 to 2 grams of saccharin to the kilo. A committee was appointed to investigate the sanitary aspects of the matter. In the meeting of June 22d, Dr. Dujardin-Beaumetz reported that the use of saccharin in aliments presented danger to the public health; saccharin was not an aliment but a medicament; if its use outside of therapeutics is not prohibited, it will "augment the already too numerous falsifications of food products."—Amer. Jour. Pharm., Aug. 1888, 406; from Le Prog. Méd., July 7, 1888.

Saccharin—Condemnation of its Use as an Aliment.—A committee of the Seine Council of Hygiene, composed of Messrs. Péligot, Gautier, Jungfleisch, Proust and Riche, declare saccharin not to be an aliment, but a medicament, and express the conviction that this substance will find its chief use as an adulterant of alimentary substances.—Amer. Drugg., Sept. 1888, 175.

Salicylic Acid—Distinction from Carbolic Acid and Resorcin.—L. v. Itallie observes that salicylic acid may be distinguished from carbolic acid and resorcin by adding to an aqueous solution a few drops of a ferric solution and then lactic acid; the addition of a single drop of this last reagent changes the violet color, due to carbolic acid and resorcin, to a yellowish-green, while that due to salicylic acid is not affected until more than ten drops have been added.—Apoth. Ztg., 1889, 100.

Salicylic Acid—Detection in Beverages and Food.—Dr. Ripper offers the following, based on the solubility of the acid in a mixture of equal volumes of ether and petroleum-ether, in which extractive and tannin are almost insoluble. 50 c.c. of the liquid, or if a solid a definite quantity mixed with water, are acidulated with 5 c.c. of dilute H_2SO_4, and agitated with 50 c.c. mixed ether and petroleum-ether in a separating funnel; should the liquids not separate readily, addition of a little alcohol will assist. The ethereal solution is removed and agitated with 50 c.c. of ether-saturated water, to extract acetic acid, which is present especially in beverages, the ethereal layer filtered, the solvent evaporated and the residue dissolved in 20 c.c. water. If a qualitative test is all that is required, a drop of Fe_2Cl_6 is added; for a quantitative test, a few drops of phenolphthalein solution are added and the liquid titrated with $\frac{1}{10}$ normal KOH.—Pharm. Ztg., 1888, 317.

Salicylic Acid—Use for the Preservation of Volumetric Solutions.—Hugo Bornträger finds salicylic acid, recommended by F. Mohr some thirteen years ago for the same purpose, to be very serviceable for preserving volumetric solutions, which often owe their decomposition to micrococci existing in the water. As an example, the author mentions volumetric solution of hyposulphite of sodium, which is known to be one of the most unstable solutions, and which had been treated with a small quantity of salicylic acid ("as much as the point of a knife will hold, for every liter"). In the course of six weeks it was frequently tested and found to have preserved its titer decidedly better than without the preservative.—Amer. Drugg., Nov. 1888, 213; from Zeitsch. f. Anal. Chem., 1888, 641.

Salicylic Acid—Use for Preserving Eggs.—According to the Bull. de Pharm. de Lyon, the merchants of that city are now preserving eggs in salicylated water instead of lime water. The merchants claimed that the preservation was due to the fact that the water was kept purified by the acid, which latter could not, however, penetrate to the substance of the egg. Mr. Lambert, a local pharmacist, finds nevertheless that the salicylic acid passes through the membrane by endosmosis and becomes diffused into the yelk. His tests were as follows: Beat up the white with a little acidulated water and agitate with ether, which, on evaporation, leaves the salicylic acid, characterized by its reaction with weak perchloride of iron. The same method is used for the yelk, whose albumen should first be coagulated by heat in order to keep the oil from emulsifying.—Amer. Jour. Pharm., Nov. 1888, 565.

Cresol-Salicylates—New Substitutes for Salol.—Salicylates may be prepared from ortho, meta or para cresol by a process similar to that used in the making of salol. They are insoluble in water, slightly soluble in cold alcohol, and are easily crystallized. Mr. Nencki states that they decompose in the economy, where they exert an antiseptic power equal to that of salol, without producing toxic effects. Mr. Sahli is quoted as saying: "When a considerable dose of antiseptic substance is to be introduced into the digestive tract, the salicylates of ortho or para cresol should have the preference over salol." The same writer prefers these salts to salol in articular rheumatism and vesical maladies.—Amer. Jour. Pharm., May 1889, 243; from Répert. de Phar., March 10, 1889, and Compt. Rend., Feb. 4, 1889.

Sodium Salicylate—Preparation of Stable Solutions.—S. Demant observes that solutions of salicylate of sodium after a short time develop a red color, rendering them unfit for use. This decomposition takes place especially in alkaline solutions; a fresh solution of sodium salicylate has a slightly acid reaction, but this reaction, especially in concentrated solutions, is destroyed, and instead an alkaline reaction appears, dependent

upon which is the depth of color of the solution. The author gives the following formula for a 20 per cent. solution, which remains unchanged for months; its stability is due to a slight excess of salicylic acid, which in no way interferes with its action: 400 parts distilled water are heated to the boiling point, allowed to cool to 30° C., 100 parts salicylic acid added, and then 60 parts bicarbonate of sodium introduced in small portions, with constant stirring; the solution is filtered through absorbent cotton, and diluted with sufficient distilled water to make 600 parts.—Oesterr. Ztsch. f. Pharm., 1889, 171.

Salicylate of Zinc—Convenient Preparation.—According to L. v. Itallie, salicylate of zinc is made rapidly and cheaply by boiling for several minutes 34 parts sodium salicylate, 29 parts zinc sulphate, and 125 parts water; after cooling the mass of crystals is collected on a filter, washed several times with small portions of water, and finally recrystallized from boiling water. The salt has the formula $Zn(C_7H_5O_3)_2 2H_2O$; 1 part dissolves in 25.2 parts water and in 3.5 parts alcohol; the anhydrous salt dissolves in 36 parts ether and 450 parts chloroform. For external use it can be applied as a fine powder or salve, also as a solution in collodium. —Pharm. Ztg., 1889, 131.

Bismuth Salicylate—Preparation.—R. Rother communicates the following formula for the preparation of salicylate of bismuth:

Bismuth subnitrate	306 grs.
Salicylic acid	138 grs.
Nitric acid	300 grs.
Ammonia water	600 grs.
Water sufficient.	

Mix the nitric acid with 100 grains of water, add the subnitrate of bismuth, and stir the mixture until a clear solution is obtained, To this gradually add water, meanwhile stirring the mixture, until it measures one and a half fluid ounces. Now dilute the ammonia with water to the measure of half a pint, and then pour the bismuth solution into it with constant stirring of the mixture. Collect the precipitate on a filter and wash it thoroughly with water. Mix the washed precipitate with half a pint of water and add the salicylic acid. Place the mixture where it may become lukewarm and stir it occasionally during twenty-four hours' digestion. Decant the violet-tinted liquor (the color being due to the presence of a trace of iron in the condition of ferric salicylate), rinse the precipitate into a suitable filter, and after appropriate washing and draining expose it to the open air to dry.—Pharm. Era, Dec. 1888, 468–469.

Salicylate of Mercury—Preparation and Characters.—Dr. E. Pieszczek observes that salicylate of mercury is readily obtained by the action of salicylic acid upon yellow oxide of mercury, as proposed by J. Kranzfeld. But the *dry* oxide resists the action of the acid, and he, therefore, pro-

poses the recently precipitated oxide, as follows: 27 p. of mercuric chloride are dissolved in 20 times the weight of lukewarm water, the solution is allowed to cool to about 15° C., filtered, and slowly stirred into a cold mixture of 80 parts of officinal (P. G.) solution of soda and 200 p. water. After subsidence, the clear liquid is decanted, the residue washed, first by decantation, then on a filter, until the reaction for chlorine ceases, and is then transferred to a flask, water being added to make a thin, *perfectly smooth* magma, and heated on a hot steam-bath with 15 p. of salicylic acid. By agitating the contents of the flask occasionally the yellow color of the mixture soon changes to a snow-white, and is completely converted into salicylate. This, containing a slight excess of salicylic acid, is washed with warm water until the washings no longer react acid. Dried at a moderate heat, salicylate of mercury so obtained constitutes a light, amorphous powder, which when suspended in a little water forms a perfectly clear solution on the addition of a few drops of soda solution. Hydrochloric acid occasions in such solution a gelatinous precipitate. The salt contains 59.16 per cent. of salicylic acid, and corresponds to the formula $C_7H_4HgO_3$.—Arch. d. Pharm., Feb. 1889, 172–174.

Salicylate of Mercury—Preparation by Precipitation.—According to C. Goepel mercuric salicylate can be made by precipitation as follows: Dissolve two grams mercuric oxide in acetic acid diluted with a little water by application of heat, dilute to 200 c.c., add a solution of sodium salicylate (about 3.13 grams) until precipitation ceases, filter, wash precipitate with water until washings are no longer affected by H_2S or Fe_2Cl_6; yield three grams. The product is a white amorphous powder, soluble in solution of sodium chloride.—Pharm. Ztg., 1889, 206.

Salicylate of Mercury—Variation According to Process of Preparation.—J. J. Kranzfeld observes that the reactions of salicylate of mercury, solubility in solutions of NaOH and NaCl, are not gotten with the product obtained by the precipitation of $HgCl_2$ with sodium salicylate; the formula for this salt is $(C_7H_5O_3)_2Hg$. The process, if modified, so as to precipitate first the mercuric oxide from 271 parts $HgCl_2$ with NaOH, washing, transferring to a vessel, covering with water, adding 138 parts salicylic acid, and warming for a few hours, with frequent stirrings, until the yellow color of the oxide is changed to the white color of mercuric salicylate, will yield a product which should be entirely soluble in NaOH; should this not be the case, an additional quantity of salicylic acid should be added. The precipitate is washed and dried at a moderate temperature; it possesses the formula

$$C_6H_4\begin{matrix}O\\CO.O\end{matrix}\!>Hg.$$

—Pharm. Ztschr. f. Russl., 1888, 641.

Dinitroisophtalic Acid—Preparation and Characters.—Ad. Claus and S.

Wyndham obtained dinitroisophtalic acid $(C_6H_2.(NO_2)_2(COOH)_2$ by acting upon isophtalic acid with fuming nitric acid in a sealed tube. The new acid is very sparingly soluble in cold water, more readily in hot water, in alcohol and in ether, and crystallizes from water with 5 mol. of water of crystallization. The *sodium salt* $(C_6H_2 . (NO_2)_2(COONa)_2+2H_2O)$ is readily soluble in water, and forms indistinctly crystalline crusts. The *potassium salt* has an analogous constitution. The *barium salt* contains 7 mol. of water, and crystallizes in characteristic aggregations of crystalline scales, grouped in the form of rosettes. The *calcium salt* and the *magnesium salt* both contain 2 mol. H_2O.—Arch. d. Pharm., Dec. 1888, 1126; from Jour. f. Prakt. Chem., 38, 313.

Citric Acid—A Natural Constituent of Cow's Milk.—Experiments made by G. T. Häckel have confirmed the presence of citric acid as a normal constituent of cows' milk. The examination of a great number of samples show that they contain from 1.8 to 2.2 gms. of calcium citrate, and from 0.9 to 1.1 gms. of citric acid per liter, or about 0.1 per cent. of citric acid; so that the quantity of citric acid yielded by a good milking cow in a day amounts to as much as that contained in two or three lemons. The lime found in milk serum generally exceeds that combined with the mineral acids; the presence of citric acid will now explain this apparent anomaly. This acid is supposed to be derived either from citric acid in the hay or green fodder, or to be formed from the decomposition of cellulose. The concretions frequently found in condensed milk consist of pure calcium citrate, and as human milk contains no citric acid, it is perhaps characteristic of milk from herbivora.—Amer. Drugg., Feb. 1889, 25; from Biederm. Centralh.

Citric Acid—Distinction from Tartaric Acid.—Saltzer states that if solution of citric acid be colored by the addition of one drop of potassium chromate solution, the color, even after addition of a few drops of sulphuric acid, does not change on several days' standing. Tartaric acid under similar conditions, especially on addition of sulphuric acid, more or less rapidly according to quantity present, changes to the violet color of the sesqui salts of chromium, and it is possible to positively detect ½ per cent. tartaric acid in citric acid by allowing the time of observation to extend to a few hours.—Amer. Jour. Pharm., Sept. 1888, 452; from Ber. d. D. Chem. Ges., 1888, 1910.

Citric and Tartaric Acid—Preservation of Aqueous Solutions by Salicylic Acid.—C. Reinhardt reports a method for preserving solutions of citric and tartaric acids, which is not at all new, but deserves to be recalled to memory, for the benefit of those who have to keep solutions on hand. A 10 per cent. solution of either acid in water will keep for years without the formation of fungi, if about 4 grains of salicylic acid are added for each quart of solution. In the case of tartaric acid, even 2

grains will answer.—Amer. Drugg., Feb. 1889, 36; from Zeitschr. f. Angew. Chem.

Citrates and Tartrates—Estimation in Admixture.—J. S. Ward employed two methods for the estimation of mixtures of citrates and tartrates; the one depending on the solubility of potassium citrate in a mixture of 2 parts of methylated spirit and 1 of water, to the exclusion of the acid tartrate, and the subsequent conversion of the potassium citrate into the calcium salt; the other depending on the precipitability of tartaric acid as calcium salt in the cold, calcium citrate remaining in solution, the latter being subsequently rendered insoluble by evaporation to dryness, etc. He found both methods to give results that were in each case too low. Calcic citrate is apparently slightly soluble in boiling water; acid tartrate of potassium in the presence of citrate is evidently slightly soluble in dilute methylated spirit of the strength above mentioned; and calcium tartrate in the presence of citrate is not completely precipitated in twelve hours, although when alone it is —Pharm. Jour. and Trans., Nov. 10, 1888, 380–381.

Tartaric Acid—Improved Process of Assay.—Messrs. Goldenberg, Geromont & Co. communicate the following impoved process for determining tartaric acid in argols, etc.: Six grams of the finely powdered substance are stirred with 9 c.c. of HCl (s. g. 1.10), a like volume of water is added, and the mixture is digested with frequent stirring for 1–2 hours at the ordinary temperature. The liquid is made up to 100 c.c. with water, and passed through a dry filter. 50 c c. of the filtrate are now placed in a beaker, which must be kept well covered, 10 c.c of K_2CO_3 solution (containing 3 grams K_2CO_3) are added, and the mixture is boiled for some time, whereby the CO_2 is expelled, and the $CaCO_3$ contained in the sample is completely separated in a crystalline condition; after filtering off and washing the latter, the solution is evaporated to about 10 c.c., acidified with 2–2 5 c.c. of glacial acetic acid, gradually introduced with constant stirring; 100 c.c. of pure alcohol of 90°–96° Tr. are added, and the whole stirred until the precipitate is distinctly crystalline. After frequent washings (with alcohol, ? Rep.) by decantation the precipitate is collected on a 9 cm. filter, which, with precipitate and dish, must be washed free from acetic acid by means of alcohol. The filter, with the precipitate, is now transferred into a beaker, the dish is washed with boiling water, which is added to the contents of the beaker, and the whole is titrated by normal alkali. The number of c.c. of alkali used, multiplied by five, gives the percentage of tartaric acid in the lees or argols.—Amer. Drugg., Aug. 1888, 143; from Chem. Ztg. through Jour. Soc. Chem. Ind.

Tartaric Acid—Improved Method of Estimation.—Dr. N. v. Lorenz suggests the following improvement in the Goldberg method for the analysis of materials containing tartaric acid: Fifteen gms. tartar or lees of

wine (7.5 gms. tartrate of lime) are comminuted as finely as possible and mixed with 250 c.c. (or respectively 150 c.c.) of water and 6 gms. of dry potassium chlorate in a porcelain capsule, holding at least 700 c.c., and boiled for twenty minutes over an open fire, stirring well and replacing the water lost by evaporation. When cold, the entire contents of the capsule are rinsed into a flask holding 500 c.c. (respectively 250 c.c.), and filled up to the mark. After it has been well shaken up it is filtered through a dry folded filter into a dry glass; 100 c.c. of the filtrate is then evaporated in a porcelain capsule of the size above mentioned on the water-bath until saline matter is just on the point of being deposited. The contents of the capsule, while still warm, are mixed with 5 c.c. glacial acetic acid, stirred until all the carbonic acid is expelled, after the lapse of five minutes mixed with 100 c.c. absolute alcohol, and stirred for two minutes. After fifteen minutes it is filtered through a filter holding 50 c.c., using, in preference, the filter-pump. The capsule is then washed with absolute alcohol until the filter is filled with the rinsings, using about 50 c.c. of alcohol. The margin of the filter is then twice washed with absolute alcohol, using each time 25 c.c., and letting the liquid drain thoroughly away. The filter with its contents is then returned to the precipitation-capsule, covered with 200 c.c. of water, heated to a boil, and titrated as follows with soda-lye, which must not be stronger than 0.3 normal. The hot liquid is mixed with neutral tincture of litmus, and the lye is then let run in until the bright red becomes decidedly dark red. It is then boiled for five minutes until the margin of the liquid has lost its violet cast, and become a dead blue. The lye consumed is calculated for 3 gms. of the original substance. The alkaline lye is standardized by means of a tartar obtained from Seignette's salt and hydrochloric acid, after repeated crystallization from hot water. —Chem. News, July 20, 1888, 37; from Zeitschr. f. Anal. Chem., xxvii, Part 1.

Tartaric Acid—Reduction by Ferrous Sulphate.—The theory of Liebig, that the formation of sugar in plants is dependent on the preliminary formation of simply constituted organic acids—the so called vegetable acids—has now received further support by the studies and experiments of M. Ballo upon the action of iron upon vegetable acids. He was induced to make these experiments in order to determine the function of the iron in chlorophyll, which remained unexplained by the theories opposed to Liebig's—by Bayer, and by Loew and Bokorny—that the formation of sugar in plants was due to the direct action of carbonic acid, or formaldehyd, upon sugar. Ballo has found that when iron—as ferrous sulphate—is caused to act upon tartaric acid, the latter is very readily reduced to bodies which are more nearly related to carbohydrates than any other vegetable acid. He obtained a new acid

Isoarabinic Acid, $C_6H_{10}O_5$, together with small quantities of

Isoarabinic Acid Hydrate, $C_6H_{12}O_6$, and therefore an isomer of dextrose. Isoarabinic acid constitutes a thick, nearly colorless syrup, which does not reduce Fehling's solution, is miscible in all proportions with water, and when incinerated gives off a caramel odor.—Arch. d. Pharm., June 1889, 551; from Ber. d. D. Chem. Ges., 1889, 750.

Tartar Emetic—Desirable Character of the Salt and Methods of Estimation.—Prof. Dunstan and Miss L. E. Boole have made some comprehensive experiments with a view to determining a more reliable method for the estimation of antimony in tartar emetic than that of the British Pharm. This directs that "twenty-nine grains dissolve slowly but without residue in a fluidounce of distilled water at 60° F. (15.5° C.) and the solution gives with sulphuretted hydrogen an orange precipitate which when washed and dried at 212° F. (100° C.) weighs 15.1 grains." These instructions stand in need of considerable amendment to render them of any service in practice. Unless the solution is first acidified, oxy salt is invariably carried down with the sulphide, and this, together with free sulphur, will cause the result to be higher than that which is demanded by the known composition of the salt. Acid tartrate of potassium is also precipitated, and it is difficult to remove the whole of this salt from the precipitate unless it is washed with an unusually large quantity of water. Further, it is extremely difficult to filter the finely divided sulphide, in fact, it is almost impossible to do so, unless the liquid containing the precipitate is boiled for some time; but this generally leads, when free acid is present, to the decomposition of some of the sulphide, and in this way error is introduced. Again, antimony sulphide cannot be completely dried at 100° C. A small quantity of water, about two per cent., is obstinately retained, and is only lost with difficulty at a higher temperature; indeed, according to Fresenius, even at a higher temperature a current of carbon dioxide is necessary to effect its entire expulsion. It is chiefly for these reasons that chemists in general have long since abondoned the method of directly weighing the antimony sulphide, and yet the process is adopted, as a test of purity, in the British Pharmacopœia, without any allusion to these various sources of inaccuracy. Lastly it should be observed that the amount of antimony sulphide represented by the Pharmacopœia as obtainable from 29 grains of tartar emetic is 15.1 grains, whereas the quantity demanded by the formula of the salt ($SbOKC_4H_4O_6$, $\frac{1}{2}H_2O$) is only 14.67 grains. Looking for available methods for the estimation of the tartar emetic, the authors find that a

Volumetric Method of Estimation is quite accurate. It depends on the reaction occurring between solutions of tartar emetic and iodine in the presence of sodium bicarbonate. When bicarbonate of sodium is dissolved in a solution of tartar emetic, no visible change is observed at first, but after the lapse of a few minutes the liquid becomes turbid, and

gradually nearly the whole of the antimony falls as a white precipitate of antimonious hydrate.

$$NaHCO_3+Sb.OK.C_4H_4O_6+H_2O=$$
$$KNaC_4H_4O_6+Sb(OH)_3+CO_2.$$

If a solution of iodine is added to the liquid before the precipitation has commenced, it is immediately decolorized, and a sharp termination of the reaction is observed. If, however, the solution of iodine is not added until precipitation has commenced, then wholly incorrect results will be obtained, since the precipitated hydrate is hardly attacked by the iodine. The

Action of Alcohol on an Aqueous Solution af Tartar Emetic can also be utilized for the estimation of that salt, the precipitate produced being entirely constituted of an anhydrous tartar emetic ($SbOKC_4H_4O_6$). Furthermore, the

Specific Rotation of Aqueous Solutions of Tartar Emetic may be utilized to distinguish this salt from any of the double oxalates of antimony and potassium, which are used in dyeing as substitutes for tartar emetic, since solutions of these salts are devoid of action on polarized light. The authors have examined twelve commercial samples of tartar emetic, and found many of the specimens as pure as might be reasonably expected. They noticed, however, in several specimens, that they contained more antimony than the formula $SbOKC_4H_4O_6,\frac{1}{2}H_2O$ calls for, this being accounted for by the loss of water by efflorescence. On this and other grounds it would be a distinct advantage if it were required that the

Anhydrous Tartar Emetic should alone be used in medicine. It is easily prepared pure, and when once prepared it is not, as the hydrous crystals are, liable to spontaneous change, and in addition it is more readily soluble in water. To prepare the anhydrous salt a strong aqueous solution of tartar emetic is precipitated by a large excess of methylated spirit, the precipitate is decanted or filtered, washed with methylated spirit, and quickly dried over a water-bath. The specific rotation of aqueous solutions of this salt has been mentioned in a previous part of this paper. The solubility in water was determined at 15°. It was found that one part of the salt dissolved in 14.53 parts by weight of water.—Pharm. Jour. and Trans., Nov. 17, 1888, 385–387.

Malic Acid—Occurrence in, and Separation from Suint.—Buisine has found considerable quantities of malic acid in the washings of sheep wool. The washings were acidulated with phosphoric acid, distilled to remove the volatile acids, concentrated, the fatty matters removed, and the residual watery solution extracted with hot alcohol. The alcohol being distilled off, the residue was shaken with ether, the ethereal solution

evaporated, and the acid residue—composed of succinic, benzoic, lactic, and malic acid—converted into barium salts, which were easily separated by their different solubilities. Wool-washings, containing 20 per cent. of solid substance, yielded about 2.5 per cent. of malic acid, and nearly as much succinic acid. The presence of malic acid in animal secretions has hitherto not been observed, it being regarded exclusively as a product of vegetable tissues. The author's experiments exclude the probability that these acids are the product of the decomposition of other substances contained in the suint.—Arch. d. Pharm., Aug. 1888, 749; from Jour. de Pharm. et de Chim., 1888, xviii, 28.

Gymnemic Acid—Characters.—Several years ago David Hooper communicated the results of a chemical examination of the leaves of *Gymnema sylvestre* (see Proceedings 1887, 124), which possess the singular property of destroying the power of the tongue to appreciate the taste of sweet substances. This property appears to be due to *gymnemic acid*, which the author describes in the present paper. He finds that gymnemic acid exists in the leaves in the form of a potassium salt, and is best prepared by treating the aqueous solution of the alcoholic extract with a mineral acid, washing the precipitate, and drying in a current of hot air or over a desiccator.

The acid is a brittle black resinous substance, of a greenish color when reduced to powder. It is insoluble in water, soluble in alcohol (with an acid reaction), ether, benzol, and chloroform, and slightly in amylic alcohol and carbon bisulphide. With potash, soda, and ammonia it affords fine red solutions with an orange colored froth, and precipitated on the addition of acids. It dissolves in concentrated sulphuric and nitric acids with intense red color, and in both mixtures it is destroyed and precipitated by water. Prolonged contact with nitric acid forms a soluble nitro-compound or product soluble in water. It fuses at about 60° C. into a black liquid of thick consistence; above 100° it gives off creasotic fumes, and, at a higher temperature, burns with a bright smoky flame, leaving no ash. It is thrown down as a bulky grey mass with plumbic acetate, and the lead salt may be decomposed by hydrogen sulphide in the presence of spirit. It is also precipitated by ferric chloride, silver nitrate, barium and calcium salts, but not by tannin, picric acid, and gelatin solution. It forms insoluble salts with alkaloids, and this accounts for its masking the taste of quinine and other bitter substances. Its empyrical formula is $C_{32}H_{55}O_{12}$. Gymnemic acid is evidently a monatomic acid from the compositions of its silver and lead salts, and its molecular weight, 631, agrees with its power of saturating alkali. It was found by experiment that 0.631 grm. of the acid, treated with centinormal solution of causticsoda, did not strike a red color with phenolphthalein until sufficient solution, equivalent to about 0.040 grm. of NaHO, had been added. The acid is a glucoside. After boiling for about an hour with dilute hy-

drochloric acid, a dark resinous mass, devoid of the peculiar property of gymnema leaves, remains, and the liquor contains a body which readily reduces Fehling's solution.

Gymnemic acid occurs in other species of *Gymnema* besides *sylvestre*. *G. hirsuta* contains a considerable quantity, and *G. montanum* leaves contain it in a smaller proportion.—Chem. News, April 5, 1889, 159–160.

Agaric Acid—Physiological Action, etc.—Dr. Hofmeister describes the physiological action of agaric acid, which, when pure, is a bibasic triatomic homologue of the malic acid series, having the formula $C_{14}H_{27}(OH)<^{CO\,OH.}_{CO\,OH.}$ Its solubility is but slight in cold, and fair in boiling water. The neutral alkaline salts dissolve readily, and, like the salts of the higher fatty acids, easily break up in solution into free acid and basic salt. Locally its action is that of an irritant. When swallowed, large doses produce vomiting and diarrhœa. The general action on cold-blooded animals is a gradually progressive central paralysis, weakening of the heart, and suppression, or marked depression of the cutaneous secretion. The only symptoms produced in dogs by large doses administered by the mouth were vomiting and diarrhœa. By subcutaneous and intravenous injections in rabbits, it was found that the vaso-motor and vagus centres were first stimulated and finally paralyzed. Death was caused by failure of respiration, and in animals subjected to artificial respiration, by failure of the heart. The action of agaric acid on the secretion of sweat proves it to be decidedly anti-hydrotic. Owing to the local irritant action of the drug and its salts, the subcutaneous administration is forbidden. On the other hand, vomiting and diarrhœa need not be so dreaded when the pure drug is used, as the experience of those who have tried the commercial agaricin might lead us to do. As to the dose of the pure acid, 0.05, and in one case 0.1, given to phthisical patients, caused slight temporary nausea and signs of intoxication. Doses of 0.02 and 0.03 were, without exception, well borne. The anhydrotic effect became first manifest hours after the drug was taken, and lasted for over twenty-four hours. Hence it is possible to get the full benefit of a large dose, and at the same time avoid the unpleasant effects, by repeating small doses at short intervals. The large doses should not be ventured on unless it is quite certain that we are dealing with pure, white, well-crystallized agaric acid, which does not taste bitter when dissolved in weak alcohol, and forms a colorless solution in boiling water.—Amer. Jour. Pharm., May 1889, 253–254; from Arch. f. Exper. Pharmakologie, xxv; through the Med. Chron., March 1889.

Strophantate of Lime—Characters, etc.—The diuretic properties of "strophantate of lime" having been pointed out by Catillon, its character is described as follows in a report to the Soc. de Thérap.: This

compound is tasteless, deliquescent and of an alkaline reaction; sulphuric acid gives with it an abundant precipitate of sulphate of lime; carbonic acid does not disturb it; with oxalate of ammonia it gives oxalate of lime; solutions acidulated with hydrochloric acid are precipitated by iodohydrargyrate of potash and phosphomolybdate of soda. "It is this reaction—common to alkaloids — which led certain authors to believe that strophanthus contained an alkaloid." In treating a concentrated solution of strophantate of lime with sulphuric acid until a cessation of precipitate, filtering, then precipitating with a large excess of alcohol, and in again taking up the precipitate with alcohol of 70 per cent., Mr. Catillon obtained the azotized substance which was combined with lime. —Amer. Jour. Pharm., June 1889, 287; from Répert. de Pharm., April 10, 1889.

Azalaïc Acid.—Production by oxidizing agents from *shellac*, which see under "Materia Medica."

Uric Acid—Occurrence in the Urine of Herbivorous Animals.—In view of the fact that hitherto there have been no definite statements made in literature as to the occurrence of uric acid in the urine of herbivorous animals, F. Mittlebach has examined the urine of 42 animals, and found the presence of uric acid in each instance.—Arch. d Pharm.

Morrhuic Acid—A New Principle from Cod-liver Oil.—MM. Gautier and Mourgues find in cod-liver oil an acid, relatively abundant, having "the double function of an acid and an alkali." It is found, like the ordinary lecithins, in unstable and complex combinations, *i. e.*, it changes with acids or alkalies, setting free glycerin and phosphoric acid. It separates slowly and continuously from alcoholic or aqueous acidulated extracts of cod-liver oil, even when brought together cold. Morrhuic acid, recently precipitated, is oleaginous and viscous, but may be crystallized in square, flat prisms, or in lanceolate forms. It dissolves in hot water, and precipitates on cooling. It is soluble in alcohol; sparingly so in ether. It reddens litmus, decomposes the carbonates, unites with alkalies, and gives salts which precipitate the acetates of lead and the nitrate of silver, but not the acetate of copper, even with heat. It combines with acids and with bases. On submitting it to distillation with alkalies, and to oxidation, we became assured that it belongs to the pyridine series. Its formula is $C_9H_{13}NO_3$, thus differing from tyrosin only by having 2H more. To separate morrhuic acid, it is only necessary to exhaust the oils methodically with alcohol at 35° C. (95° F.), acidulated with 5 per cent. of hydrochloric acid. The alcoholic liquors are saturated with carbonate of potash and distilled in vacuo at 45° C. (113° F.). The residuum is again acidulated, carried for an instant to 100° C. (212° F.), and again taken up by alcohol at 85° C. (185° F.). Evaporation leaves the thick, viscous oil, which constitutes morrhuic acid.—Comptes

rendus; L'Union Phar., Dec. 1888; Amer. Jour. Phar., March 1889, 137.

Filicic Acid—Preparation and Characters.—G. Daccomo prepared filicic acid by agitating the oleo-resin of male fern with a mixture of two volumes 95 per cent. alcohol and one volume ether, which precipitated the acid as a brown resinous mass. After purification a glistening, odorless pale-yellow crystalline powder was obtained, melting at 179–180°. Heated above 100°, it assumes a golden color, taking the original color again on cooling. Insoluble in water, sparingly soluble in absolute alcohol; more soluble in glacial acetic acid, ether, amylic alcohol and toluol; easily soluble in chloroform, carbon disulphide and benzol. Its formula is $C_{14}H_{16}O_5$. Heated in a sealed tube to 170–190°, it is decomposed into isobutyric acid, and a red substance, having the formula:

$$C_{20}H_{18}O_7.C_{14}H_{16}O_5+H_2O=C_4H_8O_2+C_{10}H_{10}O_4.$$

Two molecules of the last substance, by loss of one molecule of H_2O, give the compound $C_{20}H_{18}O_7$. By oxidation with $K_2Mn_2O_8$, and also with HNO_3, butyric and oxalic acids are formed. If the compound $C_{20}H_{18}O_7$ be allowed to stand several days with HNO_3, from the solution can be obtained pearly scales, melting between 198° and 202°, sublimable, the sublimate melting at 127–129°; by analysis found to be phthalic acid; oxalic acid is also formed by this oxidation. These reactions indicate that filicic acid is the isobutyrate of oxynaphthoquinone.—Ber. d. D. Chem. Ges., 1888, 2962.

Tannin.—Percentage Present in Sumach Leaves.—See *Rhus glabra*, under "Materia Medica."

Tannin—Colorimetric Estimation in Teas, Nutgalls, etc.—Dr. S. J. Hinsdale proposes the following as convenient for the determination of tannin in teas, nutgalls, and other vegetable substances: 1. Dissolve 1 grain of potassic ferrocyanide in 16 fluidounces of water, and add to it 20 drops of liquor ferri chloridi. 2. Dissolve 1 grain of gallo-tannic acid, dried at 212° F., in 32 fluidounces of water. 3. Exhaust 10 grains of powdered tea with boiling water, and make the infusion to 16 fluidounces with boiling water. Place 8 wine-glasses on a white surface, in each of which place 100 minims of the iron solution (1); then, with a pipette, add to the contents of one of the glasses 5 drops of the filtered tea solution (3), and to the contents of the other glasses 10, 11, 12, 13, 14, 15 and 16 drops of the tannin solution (2), using the same pipette throughout, and observe the shades of color. After about one minute fill the glasses with water. The number of drops of solution of tannin used in the glass, which corresponds in shade of color with the glass containing the tea, indicates the percentage of tannin in the tea; thus, if 16 drops are used, the tea contains 16 per cent. of tannin. The tannin of nutgalls is

estimated in the same way, using, however, only 1 drop of the nutgall infusion instead of 5 drops as in the case of tea—each drop of the tannin solution required to secure the necessary shade of color indicating 5 per cent. of tannin. For drugs containing less than 10 per cent. of tannin proceed as in the case of tea.—Amer. Drugg., Sept. 1888, 161; from Proc. N. C. Pharm. Assoc., Aug. 9, 1888.

Tea Tannin—Estimation by Acetate of Aluminium.—John Tsawoo White, in search of a more perfect precipitant for tannin, after experimenting with different ones, finds aluminium acetate to be admirably adapted, at least for the tannin of tea. A solution of aluminium acetate was prepared by digesting the hydroxide in 1 litre of water containing 100 c.c. acetic acid for a week, then diluting to 4 litres and filtering. The solution contains 2.7 grms. Al_2O_3 per litre. 100 c.c. of the tea solution are precipitated with 50 c.c. of the aluminium solution, filtered after an hour; the supernatant liquid is not always clear. It is washed with hot water; the precipitate washes easily. The tannin is then calculated from the loss on ignition after having dried and weighed it, the drying being done at 100° C. Three experiments gave 16.9 per cent., 15.3 per cent., and 16.4 per cent. tannin, the tannate containing respectively 23.79 per cent., 26.57 per cent., and 20.17 per cent. Al_2O_3. Gallic acid is not at first precipitated by aluminium acetate solution, but gives a blue color due to traces of iron in the reagent. After some hours, however, a precipitate falls. Only 77 per cent. of the gallic acid is precipitated, the gallate containing 33.2 per cent. Al_2O_3. The filtrate gave an intense blue coloration with ferric chloride. A trial with a sample of tannin, obtained from the Rangoon Medical Hall, with aluminium acetate, gave the amount of tannin as 96.6 per cent., the tannate containing 25.07 per cent. Al_2O_3. Aluminium gallate dissolves easily in acetic acid. A solution of gallic acid, 4 grms. per litre, gave no precipitate with aluminium acetate containing additional acid of 50 c.c. per litre, even after standing over night—over fifteen hours. Tannin solution of the same strength is immediately precipitated. The tannate, however, dissolves when strongly acidified. 100 c.c. tea solution treated with 50 c.c. of aluminium acetate containing 50 c.c. additional acetic acid per litre, gave a slightly different result. The supernatant solution was clear, and it gave 13.5 per cent. tannin, the tannate containing 14.5 per cent. Al_2O_3. The author will continue his experiments on other tannic acids, and tannin-containing bodies.—Chem. News, May 31, 1889, 261–262.

Iodotannate of Mercury—Preparation and Use.—According to J. Nourry iodotannate of mercury is a soluble compound and does not possess any appreciable metallic taste. For hypodermic use a solution is prepared from mercury, 0.008 gm.; iodine, 0.05 gm.; kramerotannic acid, 0.04 gm.; and glycerin, 1 c.c.—Amer. Jour. Pharm., Aug. 1888, 407; from Bull. Gén. Thérap.

Tannic and Gallic Acids – New Tests.—S. G. Rawson observes that if a solution of tannic acid be treated with ammonium chloride alone a precipitate falls, but only with extreme slowness; whereas on the addition of ammonia a beautiful white precipitate instantly appears, but this, probably by oxidation, becomes rapidly of a reddish brown color. With gallic acid no precipitate falls in either a strong or a weak solution, but the liquid becomes of a red color, and a ring, usually of a greenish color on its lower surface, is produced, this being recognizable in solutions containing 1 part of gallic acid in 100,000 of water. In a solution of tannic acid containing 1 part of tannic acid in 5,000 of water a precipitate falls, but slowly, and with more dilute solutions, therefore, it is better to drop the mixture of ammonic hydrate and chloride very cautiously onto the top of the tannic acid solution. Where the two liquids come in contact with one another the white precipitate makes its appearance at once in a well-marked line. This white line is distinctly visible in a solution of tannic acid containing 1 part in 20,000 of water. If, however, a piece of black paper be held behind the tube, the delicacy of the test is increased, and 1 part in 50,000 parts of water may now be detected.

Another delicate test for both tannic and gallic acids is to add to the solution containing one of them, chlorine water, then ammonia, a beautiful red color being at once produced. With tannic acid the color is very well-marked and distinct, but it is not quite so noticeable with gallic acid, for with this acid, as is known, ammonia alone gives a red color. With a mixture of potassic ferricyanide and ammonia, both acids also give a dark red colored solution. In the case of tannic acid 1 part in 10,000 of water gives a distinct red color to the whole of the solution. In a weaker solution, say 1 part in 30,000 of water, the red color is best seen by looking down the test tube through the whole column of the liquid. In still more dilute solutions, containing only 1 part tannic acid in 100,000 of water, it is better to compare the tint, which is now more of a yellowish brown, with the tint of a blank experiment, *i. e.*, one containing the same amount of ammonia and of potassic ferricyanide in the same volume of water, but with no tannic acid present. Under these conditions the change in color will be perfectly apparent, and the delicacy of the reaction may be carried considerably further.—Chem. News, Feb. 1, 1889, 52.

Gallic Acid—Examination of Commercial Specimens.—Fred. Wm. Meissner, Jr., has subjected commercial specimens of gallic acid to the pharmacopœial tests. The saturated aqueous solutions yielded no precipitates with an alkaloidal salt, albumen or gelatinized starch, but produced heavy white precipitates with a solution of tartar emetic and ammonium chloride. Even in very dilute solutions of gallic acid a distinct precipitate was obtained by this test, and previous continued washing with cold water did not prevent the precipitation. Gallic acid was then prepared

by Liebig's process from tannin by boiling with sulphuric acid, recrystallizing and decolorizing with animal charcoal, remaining traces of tannin being removed by solution of lead acetate, as suggested by Watt. The crystals thus obtained answered all the pharmacopœial requirements; the result may, perhaps, have been caused by the presence of a slight amount of acetic acid. The albumen and alkaloid tests are regarded as sufficiently delicate for the detection of tannin in gallic acid, one part in thirty being easily indicated. Five samples of gallic acid on being heated to 100° C. lost respectively 9.5, 9.6, 9.75, 9.75 and 10.5 per cent. of water.—Amer. Jour. Pharm., Jan. 1889, 9.

ORGANIC BASES.

Alkaloids—Value and Application of Mayer's Reagent.—Mr. H. W. Snow read a highly interesting paper on "Mayer's reagent for the estimation of alkaloids" before the Michigan State Pharmaceutical Association (Sept. 1888), in which he aims more particularly to draw attention to a method of interpreting the results of titrations. The author's paper, which cannot be given here in abstract, will prove valuable in further elucidation of the experiments of Dr. A. B. Lyons (see Proceedings 1887, 303–308), and of his own (Ibid., 1888, 133). Briefly it may be stated that the method of interpreting the results of titrations is very simple, and consists, first, in determining the titration equivalents for alkaloids in different degrees of dilution. Then, when working on unknown material, by holding the dilution of the initial fluid always constant, the number of cubic centimeters of reagent required to precipitate the alkaloid becomes an index to the degree of dilution of the alkaloid, and thus enables the analyst to select the true experimental equivalent for calculating the weight, and, finally, the percentage of alkaloid. The present experiments embrace the alkaloids *aconitine*, *berberine*, *emetine*, *gelsemine*, *hydrastine*, *sangunarine*, *strychnine*, and *brucine*. The tables given by the author exhibit the number of c.c. of reagent required for the same quantity of alkaloid in different degrees of dilution, and the equivalent corresponding to such dilution.—Amer. Jour. Pharm., Oct. 1888, 487–497; Proc. Mich. St. Pharm. Assoc., 1888.

Alkaloid—Method of Determination in Pharmaceutical Preparations.—Cavendoni proposes the following method for the determination of the alkaloid in pharmaceutical preparations, or in the drug, believing it to give better results than the methods of Dunstan, Ransom, Coblentz, Kunz, and others. The substance or extract is exhausted with 60 per cent. alcohol acidulated with dilute sulphuric acid, the liquid is precipitated with a 10 per cent. solution of acetate of lead, the filtrate and wash-water treated with sulphuretted hydrogen to remove lead, and the sulphuretted hydrogen removed by heat. The cold filtrate is then treated with a solution of 1.35 gram mercuric chloride and 5 grams of iodide of potassium

in 100 grams of water, drop by drop, as long as a precipitate is produced; the precipitate is allowed to subside, collected on a filter, washed, dried at 40°, and weighed. The author requires that 100 grams *belladonna leaves* should yield 1.20 to 1.60 gram of precipitate, corresponding to 0.48 to 0.64 of atropine; 100 grams hyoscyamus leaves should yield 0.42 to 0.80 gram of precipitate, corresponding to 0.16 to 0.32 gram of hyoscyamine; 100 grams conium herb should yield 0.25 to 0.40 gram of precipitate, corresponding to 0.10 to 0.16 gram of coniine; 100 grams of aconite (part not stated) should yield 0.20 to 0.40 gram of precipitate, corresponding to 0.06 to 0.12 gram of aconitine, etc., etc.—Arch. d. Pharm., Dec. 1888, 1133–1135; from L'Orosi, Sept. 1888, 301.

Alkaloids—New Reagents.—Brociner finds that a solution of 1 gram niobate of ammonium, or better of potassium fluorniobate, in 40 c.c. of concentrated sulphuric acid, gives with *apomorphine* an intense brown-red color, which changes to ochre-yellow on addition of water. *Morphine* has a similar reaction, but the colors are not so pronounced. No other alkaloid gives these reactions.

A solution of chlorine in concentrated sulphuric acid, obtained by passing the gaseous body into the acid to saturation, also gives characteristic color-reactions with certain alkaloids. With *narcotine* it produces a violet color, which rapidly becomes wine-red and yellow, and then on heating gently again becoming red. With *narceine* an olive-green color is produced, changing to blue with red streaks. *Brucin* produces a red color, as it does with nitric acid.—Arch. d. Pharm., Nov. 1888, 1040; from Jour. de Pharm. et de Chim., 1888, xviii, 204.

Alkaloids—Detection after Death.—Dr. Pellacani gives an account of some experiments which he made for the purpose of determining how long various poisonous substances resist putrefaction. A fixed quantity of the poison having been introduced into a definite quantity of blood, the mixture was allowed to putrefy under favorable conditions of temperature. From time to time it was tested for the poison, the same method being carefully employed in each case. Physiological tests were used in the case of such substances as atropine, physostigmine, curarine, etc., and in other cases methods giving characteristic reactions were employed. The poisons experimented with were for the most part vegetable alkaloids, which were introduced in a free state in the following proportions relatively to the blood:—0.10 in the case of physostigmine, atropine, pilocarpine, daturine, and digitalin, and 0.50 in the case of all other substances. In this way Dr. Pellacani found that no trace of digitalin or santonin could be found in the putrid liquid after four months, while atropine, daturine, and physostigmine took thirteen months to disappear; at the end of that time there was still a trace of codeine. Morphine and picrotoxin gave signs of their presence after twenty-seven months; aconitine and cicutine were still present in considerable quantities after thirty-

four months, and veratrine was found at the end of thirty nine months. As regards curarine it remained unaltered for twenty-eight months; but after thirty-nine months the physiological test gave a negative result, although the characteristic reaction still persisted, except with the sulphuric acid test. Dr. Pellacani considers that these experiments prove that putrefaction is not so rapidly destructive of vegetable poisons as has hitherto been believed. This is particularly the case with alkaloids.—Brit. Med. Jour., July 21, 1888, p. 152; from Rivista Sperim. di Fren. e di Med. Legale.

Alkaloidal Borates—Advantage in Collyria.—Petit and Galezowski find the compounds of boric acid with alkaloids useful as preventing the local irritation often caused by the use of alkaloidal acid salts. The alkaloid, such as eserine, pilocarpine, atropine, hyoscyamine and cocaine, is first dissolved in a small quantity of alcohol. Then a quantity of boric acid equal to twice the weight of the alkaloid is dissolved in alcohol and the solutions are united. The mixture is then evaporated to dryness. An excess of boric acid is not injurious.—Amer. Jour. Phar., May 1889, 244; from Nouv. Rem., March 24, 1889.

Morphine—Chemistry and Pharmacology of some of Its Derivatives.—In continuation of their previous studies upon the chemistry and pharmacology of some morphine derivatives (see Proceedings 1888, 543), Messrs. D. B. Dott and Ralph Stockman communicate the results since obtained. The first portion of the present paper discussed the composition of the compound that was obtained in the artificial production of codeine from morphine, and was first described as dimethylmorphine, the correctness of which name is disputed. Apart from chemical considerations the authors consider that its physiological action is so different from that of methylmorphine or codeine, as to render the constitution represented by that name improbable, and the authors appear to look upon it as methocodeine. They also refer to certain acetyl and benzoyl derivatives, methyl-sulphuric-acid-ether and chlorocodide. The topics of the report were necessarily somewhat recondite, but testimony to the value of the research as helping to place medicine on a scientific basis was borne by Dr. Thresh and Mr. Plowman. Incidentally Dr. Dott remarked that the opium alkaloids do not differ from one another in their physiological action so much as is generally supposed, but might be said to form groups differing rather in the intensity than in the quality of their action.—Yearbook of Pharm., 1888, 349-355.

Morphine—Alteration in Aqueous Solution.—Dr. Lamal finds that pure salts of morphine in distilled water are unalterable if kept from the action of light and dust. Cloudy solutions arise from the development of micro-organisms. The yellow coloration, acid reaction and formation of crystals, are due to the action of light and of organic ferments. The color

arises from the transformation of morphine into an amorphous substance which appears to be morphetine. The crystals are caused by oxidation of the salt. The acid reaction is due to morphetine and the salts of oxymorphine. Apomorphine is not formed in aqueous solutions of morphine. In the blood and tissues, morphine is partly transformed into oxymorphine, which is eliminated by the urine; but morphine, as such, may be found there. In organic researches for morphine, oxymorphine should be sought for as a first product of oxidation.—Amer. Jour. Pharm., May 1889, 244; from Bull. de l' Acad. de Belg. in J. de Ph. et de Ch., Feb. 15, 1889.

Morphine Muriate—Decomposition of its Solution by the Alkali Contained in the Glass Container.—Some time ago, C. Neuss called attention to the observation that a precipitate frequently forms on standing in solutions of muriate of morphine in bitter almond water, as also in cherry-laurel water. He attributed this precipitate to the formation of hydrocyanide of morphine, but the existence of this compound was denied by Flückiger, who expressed the opinion that the precipitate would be found to consist of alkaloidal morphine, while Denner, on the other hand, regarded the precipitate to consist of oxymorphine. This latter view is now confirmed by H. Warnecke, the cause of its precipitation being the alkalinity of the glass container, such being now made from a very soft soda-glass. Green-glass vessels do not give off a portion of their alkali, and are therefore to be preferred as containers for solutions of morphine, and other alkaloids.

Oxymorphine is recognized by the color reaction with Fröhde's reagent (sulphomolybdic acid), which *at first* produces an intense blue color, which passes into the violet color produced immediately by morphine. A solution of oxymorphine in 5 to 10 drops of concentrated sulphuric acid is colored intensely green when heated on the steam-bath; morphine, under the same conditions, rose red. If the green oxymorphine solution is allowed to cool, and diluted with about 3 c.c. of water, the color changes to red, then disappears, and at the same time a white precipitate of sulphate of oxymorphine separates from the solution.—Arch. d. Pharm., Feb. 1889, 125; from Pharm. Ztg., 34, 5.

In reply to Warnecke's observations, Neuss maintains that the separation of oxymorphine is independent of the quality of the glass composing the container, and that it occurs in glass containers of whatever quality under the influence of light. He therefore earnestly recommends that morphine solutions be dispensed in dark glass vessels, so that light may be excluded as far as is practicable.—Arch. d. Pharm., March 1889, 230; from Pharm. Ztg., 34, 66, 81 and 105.

Morphine—Solubility in Different Solvents.—A. H. Allen throws doubt on Dieterich's statement that morphine is soluble in amyl alcohol in the

proportion of 1 part in 1,300, in acetic ether 1 in 1,665, and in ordinary ether 1 in 1,250. These figures do not at all agree with ordinarily accepted statements, for they show that morphine is more soluble in ordinary ether than in acetic ether or amyl alcohol, which are solvents largely employed in preference to ether for extracting morphine from its solutions. Dieterich further states that morphine is soluble in 7,000 parts of cold methyl alcohol, and in 1,660 parts of ethyl alcohol. This great difference of solvent power suggested to Mr. Allen the possibility of using methyl alcohol in opium assay according to the process of the German Pharmacopœia, as this alteration might materially diminish the error due to solubility of morphine. But on putting the matter to test, Mr. Allen found that morphine was very readily soluble in methyl alcohol, so that it would be hopeless to make the substitution suggested. Dieterich also states that morphine sulphate is "very soluble" in ether, whereas Mr. Allen finds the solubility to be 1 in 82,000, and when the ether has been previously washed free from traces of alcohol, and then dehydrated by means of potassium carbonate followed by distillation, the solubility of morphine sulphate is almost infinitesimal. Thus the residue of morphine sulphate from 50 c.c. of dry ether free from alcohol was only 0.0002 gram, corresponding to a solubility of 1 gram of the salt in 162,000 grams, or 225,000 c.c.—Amer. Drugg., Oct. 1888, 195.

Morphine—Value of Picrotoxin as an Antidote.—See "*Picrotoxin*" under *Glucosides*, etc.

Morphine—Determination in Opium.—Dr. H. Endemann having for some time past found himself in opposition to a firm of chemists who had reported on the same samples of opium, always with the result that they found one or more per cent. less of morphine than he had obtained, came to the conclusion that this difference in results was not due to greater or less care, but to the method of analysis employed by himself or by the other chemists. The process of assay employed by the author is the well-known one of Dr. Squibb, while in the other laboratory the method of Chas. M. Stillwell was employed. In examining this method, and comparing it with other methods, he finds that it is original only in the following three points: "Stillwell states, first, that he can exhaust the opium with far less water than any one else; second, he claims that it is not necessary to use such a concentrated solution to precipitate the morphine completely; and, third, he uses an inferior, less pure ether for the purification of his morphine." Dr. Endemann has examined these three points, compared the results with those obtainable under like conditions of care by the process of Squibb, and has arrived at the conclusion, that: "The difference in the analyses is due mainly to impurities in the commercial ether as used according to Stillwell, then, however, also to the incomplete extraction of the opium when extracted by the Stillwell process. The precipitation of the morphine from a more dilute solution

does not seem to affect the result seriously.—Pharm. Rundschau, Aug. 1888, 181–182.

Morphine—Colorimetric Test for Its Determination in Laudanum.—S. J. Hinsdale proposes the following colorimetric test for indicating the morphine strength of laudanum: Dissolve one grain of potassic ferricyanide in sixteen ounces of water, and add twenty drops of liquor ferri chloridi. To two drachms of this solution, in a 5 or 6 ounce tumbler, add one drop of tincture of opium, U. S. P., allow the mixture to stand one minute, add three ounces of water, and observe the shade of the blue color developed. By comparing the color produced in this reaction with the color produced by morphine solutions of known strength, the morphine strength of a tincture of opium may be estimated. The intensity or shade of color produced by officinal tincture of opium is the same as that produced by a drop of a solution of seven grains of sulphate of morphine in one ounce of diluted alcohol under the above conditions. It is important that the test solution should be freshly made, and that the drops should be uniform in size. Tannin interferes with this test, since it produces an intensely deeper shade of color.—Amer. Drugg, July 1888, 121.

Codeine—New Synthetical Method.—A. Knoll proposes to use for the methylation of morphine (conversion into codeine), methylsulphate in place of methyliodide or methylchloride hitherto proposed by Dott. The product of reaction is treated with dilute sulphuric acid, ammonia is added to remove unchanged morphine, and the codeine is extracted from the somewhat dilute solution by means of ether, benzol, or chloroform. Codeine obtained in this way is chemically pure, and corresponds in all its chemical as well as physiological characters with natural codeine. The author expresses the opinion that this alkaloid deserves the consideration of practitioners, inasmuch as its effects are fully as certain as those of morphine, and far less dangerous.—Arch. d. Pharm., March 1889, 229; from Pharm. Centralh., 30, 39.

Narceine—Close Relationship with Naphthalin.—Messrs. Claus and Meissner have made careful studies of narceine, in the course of which a close relationship to naphthalin was disclosed. By oxidation of pure narceine, $C_{23}H_{29}NO_8$, with permanganate in dilute sulphuric acid solution, a tri-basic acid, narceinic acid, $C_{15}H_{15}NO_8+3H_2O$, was gotten, which on heating to 180°–200° decomposed into carbonic oxide, dimethylamine and dioxynaphthalic acid, $C_{12}H_8O_6$.—Rdsch., 1888, 700.

Narceine—Characters of the Chemically Pure Base.—The contradictory statements respecting the characters of narceine, led E. Merck to determine a method for securing an absolutely pure base. He found the hydrochlorate of narceine to be the most suitable for the preparation of chemically pure narceine, since this salt is readily obtained pure from commercial narceine. The hydrochlorate forms short, stout, white prisms,

which are soluble in boiling water in all proportions, and contain no water of crystallization. It is a neutral salt, chemically speaking, having the composition $C_{23}H_{29}NO_9.HCl$, but has a strong acid reaction, and splits up in presence of water into a basic salt and hydrochloric acid. The pure narceine prepared from the hydrochlorate is uniform in quality. It melts at 170°–171° with evolution of gas, commencing to cake two or three degrees lower. Contrary to previous statements, it possesses a faintly alkaline reaction, and shows great affinity for acids, withdrawing traces of hydrochloric acid from the air, when exposed in a moist condition.—Pharm. Jour. and Trans., June 22, 1889, 1034–1035.

Meconarceine—An Impure Form of Narceine.—Dr. Laborde, who is noted for his investigations into the physiological actions of remedies, has recently (Rev. de Thérap., May 15, 1888) reported on the actions and uses of impure narceine, which he designates by the name of "meconarceine." He states that this substance is the alkaloid narceine, to which some other unknown alkaloid adheres, and that the combination constitutes a useful remedy. He has ascertained that it possesses hypnotic properties, and moderates the activity of the respiratory and cardiac excito-motor or reflex functions. Given in doses of one-twelfth to one-sixth of a grain, it produces tranquil sleep, and is not followed by unpleasant effects. It may be given in pill form or in a mixture with syrup. He has prescribed it successfully in insomnia due to nervousness or occurring as incident to chronic diseases, and in bronchial affections to relieve cough and to diminish the expectoration. It has proved useful also as a remedy for recent neuralgia.—Amer. Jour. Med. Science, July 1888, 66.

Meconarceine—Composition, etc.—According to E. Merck, the French preparation introduced under the name of "meconarceine" appears as a neutral yellow solution, odor of camphor, containing 0.5 per cent. alkaloid, composed chiefly of codeine, with some narceine, combined with an ether-soluble acid. A German firm has introduced a white powder sold indiscriminately under the name of "meconarceine" and

Meconate of Narceine, which is a mechanical mixture of narceine and meconic acid, melting at 110°; in dissolving this powder a chemical reaction takes place and the recrystallized product melts at 126°. Pure "meconate of narceine" was obtained by uniting equal molecules of narceine and meconic acid; it is of a lemon-yellow color, soluble in boiling water, the solution possessing an acid reaction; difficultly soluble in alcohol, the best solvent is 50 per cent. alcohol; melts at 126°.—Pharm. Ztg., 1889, 90.

Chelidonine—Occurrence in the root of *Stylophorum diphyllum*, Nuttall, which see under "Materia Medica."

Chelidonine—Characters of the Alkaloid and Its Compounds.—Dr. Al-

fred Henschke has prepared chelidonine from the roots of *Chelidonium majus* by the process of Probst (Annal. d. Pharm., 29, 123), and describes it as constituting tolerably large, colorless, glassy-glistening tabular crystals, belonging to the monoclinic system, which are insoluble in water, but soluble in alcohol, amyl-alcohol, ether and chloroform, forming very bitter solutions. It gives reactions with most of the alkaloid reagents, the degree and intensity being described. The analytical data obtained lead to the formula $C_{20}H_{19}NO_5$, the crystallized and air-dry base containing also one mol. H_2O. The

Hydrochlorate of Chelidonine constitutes fine, colorless crystals, separating from their solutions in delicate crystalline crusts. It is sparingly soluble in water, more soluble in alcohol, and its solutions react acid. Its composition $=C_{20}H_{19}NO_5HCl$.

Nitrate of Chelidonine ($C_{20}H_{19}NO_5.HNO_3$).—This salt was obtained in form of large, colorless, columnar crystals, which are sparingly soluble in water.

Sulphate of Chelidonine ($C_{20}H_{19}NO_5H_2SO_4+2H_2O$) is very soluble in water. It crystallizes from absolute alcohol, but the crystals are not very permanent, and in moist air are soon converted into a gum-like mass.

The author also describes the *platinochloride*, the *aurochloride*, and the compounds resulting from the action of iodide of ethyl, of various oxidizing agents, and of acetic anhydride.—Arch. d. Pharm., July 1888, 624–644.

Cinchona Alkaloids—Oxidation Products and Constitution.—Comprehensive experiments made by H. Z. Skraup, H. Schniderschitz and J. Würstl prove that by the oxidation of

Cinchonine with chromic acid, the cinchonine molecule is split into two halves, the first half being converted into *cinchonic acid*, the second into *cincholoipon*, and into *cincholoiponic acid.* The two latter substances are derivatives of piperidine, and it has therefore been established that the second half of the cinchonine molecule contains a piperidine groupe. By the oxidation of

Quinine, Skraup obtained *quinic acid* ($C_{11}H_9NO_3$) from the first half of the quinine molecule, and from the second half *cincholoipon* and *cincholoiponic acid*, showing the constitution of the second half of the quinine molecule to be the same as that of the second half of the cinchonine molecule.

Cinchonidine yielded by oxidation with chromic acid, like cinchonine, also *cinchonic acid* and *cincholoiponic acid*, but no *cincholoipon.* Nevertheless the constitution of the cinchonine and cinchonidine molecule possesses great resemblance. The oxidation of

Quinidine leads to very similar results, the first half of the quinidine

molecule yielding *quinic acid*, the second half *cincholoiponic acid*, but no *cincholoipon*.—Arch. d. Pharm., May 1889, 464; from Monatsh. f. Chem., 1889, 39, 51 and 65.

Cinchona Alkaloids—Use of Bromine for their Estimation.—W. T. Fawssett has made comprehensive experiments to determine the availability of bromine for the estimation of cinchona alkaloids. The observation that a solution of sulphate of quinine required considerably more bromine water to produce in it a permanent yellow tint than a similar solution of sulphate of cinchonidine, suggested the employment of this reaction as a means for estimating the cinchona alkaloids. The investigations of Laurent, Anderson, Cahours and Etard, Bloram, Jackson, and Eiloart have shown: (1) That bromine is capable of combining with alkaloids to form bromo-derivatives; (2) That the alkaloids differ in the amount of bromine with which they can combine; (3) That the amount of bromine absorbed depends on the physical conditions (temperature, solution, etc.) of the substances. With a view to insuring the constancy of these conditions, the author devised the following process: One gm. of the alkaloid or alkaloidal salt is dissolved in just sufficient dilute sulphuric acid, and the solution is diluted with water to 600 cubic centimeters, in a cylindrical vessel. The temperature of the solution must not be much below 60° F. It is now titrated with bromine water, contained in a burette provided with a well-fitting float, the first 10 c.c. of which have immediately before been estimated in the usual way. The bromine water is run in, in quantities of 5 c.c. (the color being allowed to disappear after each addition) until a permanent yellow tint is produced. The excess of bromine is estimated colorimetrically by running the bromine into a vessel of the same dimensions and containing an equal quantity of pure water till an identical tint is obtained. From this the actual amount of bromine decolorized by the alkaloid is readily calculated. From a series of experiments made to ascertain the number of atoms of bromine absorbed by a molecule of each alkaloid, it was found that a molecule of quinine, quinidine, and cupreine each absorbed approximately 6 atoms of bromine; hydroquinine, 4 atoms; cinchonidine, cinchonine, and amorphous quinine, each 2 atoms. The figures obtained were only approximately correct, commercial alkaloids having been employed. In order to confirm the results with pure alkaloids, the quinine and cinchonine were submitted to a process of purification, and it was found that their bromine absorption equivalents exactly corresponded with those given above. A correction was made for the impurities found in the hydroquinine, with the result that the bromine absorption equivalent of that alkaloid was also considered to be correct.

The behavior of bromine water on mixtures of quinine and cinchonidine, and of quinine and hydroquinine, was next observed. It was found that the bromine absorption equivalent of the mixture was the sum

of the bromine absorption equivalents of the constituents. It is therefore possible to estimate the amount of an impurity in an alkaloid by this process, at any rate when the quantity of an impurity is not very minute. It was found that the double compound of quinine and cinchonidine described by Kerner and Weller as "latent cinchonidine" has a different bromine absorption equivalent from a mixture of the alkaloids. It is therefore necessary, in estimating by this process quinine or cinchonidine containing the double compound, to decompose it by heating previously to 248° F.

A specimen of commercial sulphate of quinine was now completely analyzed, the bromine absorption equivalent being estimated at each stage of the operation. It was found that after drying, after removing the cinchonidine, and after removing the hydroquinine, the alkaloid required precisely the amount of bromine that quinine, in these various degrees of purity, was calculated to require. When, however, an impure quinine sulphate of a similar composition was artificially prepared, the bromine absorption equivalent was found to be lower than that given by the original specimen. This was probably due to the cinchonidine in the latter being in the form of the double compound. A number of essential experiments showed that the process gives constant results, the maximum error when 1 gm. of alkaloid is used being .008 gm. of bromine.

Specimens of English, French, German, and Italian quinine were estimated by the process, with the result that 1.029 gm. of bromine was found to be the average absorption equivalent of 1 gm. of commercial sulphate of quinine.

If the usual qualitative tests for impurities be first applied and the water removed, and the double compound of quinine and cinchonidine decomposed by heating to 248° F., the author considers that the process gives a ready and reliable means of estimating the value of commercial sulphate of quinine.—Amer. Drugg., June 1889, 111–112; from Pharm. Jour.

Bromates of the Cinchona Alkaloids—Preparation, etc.—Claude Grant Johnson calls attention to the bromates of the cinchona alkaloids, which have of late received some attention as therapeutic agents. The author describes the preparation of the bromates of quinine, cinchonidine, cinchonine and quinidine, by double decomposition between equivalents of the respective alkaloidal sulphate and bromate of barium. He also gives the following method, which he has found useful for preparing

Barium Bromate.—To a boiling solution of *potassium bromate* sufficient anhydrous acetate of barium is added to saturate it, and the liquor is then allowed to cool slowly. Barium bromate crystallizes out, while acetate of potassium remains in solution. To obtain the

Potassium Bromate, the author had recourse to the following method: Bromine was added to a solution of potassium hydrate, forming the bro-

mide and bromate of potassium, the bromate crystallizing from the solution because of its inferior solubility ("KBr is soluble in 1.6 parts of water, $KBrO_3$ in 16.2 parts"—Walker). The bromide remaining in solution was procured as bromate by adding the requisite quantity (calculated from the molecular weights) of potassium hydrate, and passing a stream of chlorine gas through the solution until saturated, when the bromate separated in small, irregular-shaped crystals, the reaction being as follows:

$$KBr+6KOH+3Cl_2=KBrO_3+6KCl+3H_2O.$$

The product was purified by recrystallization. The shape of the crystals depends upon the way in which they are made: from hot solution they separate as needles, but by slow cooling are obtained as four and six-sided plates, colorless and anhydrous.

Quinine Bromate was obtained in form of stellate clusters of long acicular needles, which did not effloresce or change after a month's exposure. The salt requires a single recrystallization, is sparingly soluble in cold water, bitter, and has a slight acid reaction.

Cinchonidine Bromate is not so readily obtained in crystals, on account of its more ready solubility in cold water. The crystals are white and in clusters, but are much smaller than those of quinine bromate, and the separate crystals are broader and flatter. Care must be exercised in evaporation, decomposition being liable to occur.

Cinchonine Bromate, while more soluble than the quinine compound, is less so than the cinchonidine salt; hence is more readily obtained in crystals. They are of a yellow color, the group being smaller than those of quinine bromate, but larger than those of the cinchonidine compound, and neutral to test paper.

Quinidine Bromate also forms clusters of needle-shaped crystals, which are difficult to obtain on account of the easy solubility of the salt. The salt is neutral.—Amer. Jour. Phar., March 1889, 119–121.

Quinine—Manufacture in India.—Grammie's process for the extraction of quinine, as practised in India, is essentially as follows: The bark is first reduced to powder by means of a Carter's disintegrator, and this powder is passed through a scalper, the sieves of which are made of silk, and have 120 meshes to the linear inch. This extremely fine powder in the proportion of 100 parts is mixed with 8 parts of commercial caustic soda dissolved in 500 parts of water, and there is then added 600 parts of a mixture of 1 part of fusel oil and 4 parts of kerosene oil. Slaked lime may be used in place of caustic soda, 15 parts of it being mixed intimately with the powdered bark before the water. The whole mixture—bark, alkali, water and oils—is next thoroughly agitated in barrels for four hours, then allowed to rest, and the oily layer drawn off from the top.

This oil is now agitated for 5 or 10 minutes with water acidulated with hydrochloric or sulphuric acid, whereby the alkaloids are dissolved out of the oil. Separation being effected, the oil is again transferred to the bark mixture, and agitated for two or three hours; again drawn off and washed as before in the same acidulated liquor. This process is repeated a third or fourth time, or until it is found by testing a small quantity of the oil that the bark has been thoroughly exhausted of its alkaloids. The quantity of acid required to take up the alkaloids is dependent upon the quality of the bark, and determined by preliminary assay. The after-treatment of the acidulated solution of the alkaloids is quite simple. It consists in neutralizing the liquor with ammonia or soda, and setting aside to crystallize. The crystals are collected, drained, dissolved in fifty times their weight of boiling water, and filtered hot through a little animal charcoal. The crystals formed on cooling are collected as before, drained, placed in small lumps on sheets of filter paper stretched on slabs of plaster of Paris, and finally are thoroughly dried in a room heated about 10° above the temperature of the open air. The resulting product contains other alkaloids than quinine, but in what proportion there is nothing to indicate.—Amer. Drugg., Sept. 1888, 173; from Chem. and Drugg.

Quinine Salts—Increase of Solubility in Presence of Antipyrine.—An increased solubility of quinine salts in presence of antipyrine was noticed by Triulzi and communicated to "Boll. Farm." J. Blalol has experimented, and finds that if 1 gm. hydrochlorate of quinine be heated with 0.4–0.5 gm. antipyrine and 2 gm. water, solution takes place at 25–30° C.; with 0.2–0.25 gm. antipyrine, at 44–50°; 1 gm. hydrochlorate of quinine with 2 gm. water dissolves at 52 to 56°; on cooling only the last solution deposits the quinine salt. Similar results were obtained with valerianate of quinine. This observation may be of value in preparing neutral quinine solutions for subcutaneous injections.—Rdsch, 1889, 303.

Sulphate of Quinine—Commercial Quality.—The abnormally low value of cinchona bark, and consequently of quinine, during the past three or four years, might be regarded as reducing very considerably the probability of impurity in the quinine salts of commerce. Messrs. B. H. Paul and A. J. Cownly, who have examined 23 commercial samples from different makers from time to time as opportunity offered, using the crystallization process proposed by one of them some ten years ago, find that a large proportion of the sulphate of quinine of the market contains sulphate of cinchonidine within the limit of the quantity permitted by the B. P. requirement. Three samples were absolutely free from cinchonidine salt, but nine contained amounts ranging from 6.08 to 12.34 per cent., and most of these might reasonably be held to exceed the limits of impurity allowed by the standard of the B. P. As regards the method of testing, the authors observe that the

Recrystallization Test, as given by the B. P., is liable to lead to fallacious results, and if the directions there given be followed, very impure quinine sulphate might be passed as satisfactory. In carrying out this test it is important that the solution of the quinine sulphate under examination should be made without the addition of acid. It is equally important that the mother liquor from a recrystallization should be evaporated to a small volume—when operating upon 100 grains of the salt, to about one fluid drachm—and to separate the crystals deposited before testing with ether and ammonia.—Pharm. Jour. and Trans., Feb. 23, 1889, 665.

Quinine— Criticism of Recent Tests.—W. Lenz criticizes the four principal tests for the presence of cinchonidine in quinine (which will be found in the more recent volumes of these Proceedings). He finds that the *chromate process* gives very varying results, but on the average gives the highest yield of cinchonidine, especially with the purer samples. The *oxalate test* gives the lowest numbers, but they are more concordant than those of the chromate process. The composition of the bye-product is, however, variable. The *bisulphate test* gives results varying considerably. The alkaloids in the ethereal solution ought to be submitted to the process a second and even a third time, but even with this improvement the whole of the cinchonidine is not obtained, and the results vary much, but the composition of the bye-product is more uniform than in the other processes. The *crystallization test* has the same advantages as the bisulphate test if the crystallization is repeated often enough, and is the process which is least influenced by the presence of hydro-bases. It is, however, tedious. The *process of the German Pharmacopœia* depends on the fact that the precipitate produced by ammonia in solutions of the alkaloids is soluble in excess of ammonia, but that much less ammonia is required for quinine than for the other alkaloids. The excess of ammonia required varies, however, very considerably with the temperature. —Jour. Chem. Soc., 1889, 86; from Zeit. Anal. Chem., xxvii, 549–631.

Quinine Sulphate—Efficiency of the Oxalate Test.—B. H. Snow contributes a paper giving a series of experiments made by him, mainly with the view to establishing the efficiency of Schafer's "Oxalate Test" (see Proceedings 1887, 321–322). As a result he finds that of the various tests proposed, the oxalate test is to be preferred. At the same time the test cannot be regarded as perfect, since it is efficient only by comparison with the others. There is good proof in his experiments that the separation by oxalate is not a single precipitation.—Pharm. Era, Feb. 1889, 48–51.

Quinine Sulphate and Hydrochlorate—Systematic Examination.—C. Hiebig observes that the examination of these quinine salts has caused quite a number of processes to be devised, but not one of these can be

relied upon in furnishing a positive answer regarding the purity of these salts. To frame a method which allowed the presence or absence of the more frequently occurring impurities, such as quinidine, cinchonine, and cinchonidine, to be proven in a simple and comparatively rapid manner, the majority of the published processes were carried out and their merits and defects ascertained; as the result, the following compilation has been found to work successfully.

	For Sulphate.	For Hydrochlorate.
A.	1 gm. with 15 c.c.	1 gm. and a solution of 0.4 gm. sodium sulphate in 1 c.c. water, with 30 c.c.

of distilled water are agitated for five minutes, and filtered. To the filtrate is added 0.5 gm. Rochelle salt, agitated for five minutes, allowed to stand five minutes and filtered; the precipitate of tartrates is collected on a small filter and reserved, the filtrate for the

B. Detection of quinidine and cinchonine is divided into two portions, one of which is reserved; to the other add one drop of water of ammonia, and allow to stand for a few moments.

1. The solution remains clear; absence of quinidine and cinchonine; proceed *E*.

2. The solution becomes turbid; presence of quinidine and cinchonine, or both; proceed *C*.

C. Detection of Quinidine. To the reserved portion (see *B*), add 0.5 gm. KI, shake for five minutes, allow to stand for some time. Result:

1. The solution remains clear, if quinidine is absent; proceed *D*.

2. The solution becomes turbid or deposits resinous precipitate. In this case cinchonine must first be tested for, according to *D*, and then

a. In absence of cinchonine, the turbidity with KI indicates the presence of quinidine; proceed *E*.

b. In presence of cinchonine, the ammoniacal solution in *B* is filtered, the precipitate washed with distilled water, and the thalleioquin reaction carried out with the precipitate. If the intense green color is produced, there is quinidine present; if the green color is not produced, quinidine is absent. Proceed *E*.

D. Detection of Cinchonine. The liquid after addition of KI is filtered, and one drop of water of ammonia added; set aside for a few minutes; there results:

1. Perfectly clear solution, in absence of cinchonine. Proceed *E*.

2. Turbid solution, if cinchonine is present. Proceed *E*.

E. Detection of Cinchonidine. If in the foregoing examination cinchonine or quinidine is found, the precipitate of tartrates (see *A*) is carefully washed with 15 to 20 c.c. Rochelle salt solution (1 to 20); were these alkaloids not found this washing is superfluous. The precipitate is dissolved off the filter by use of 3 c.c. dilute H_2SO_4 (1 to 20); to the

solution 2 c. c. of ether and 1 c. c. water of ammonia are added; the mixture is well shaken for one minute and allowed to stand at rest five minutes. This shaking and allowing to stand is repeated several times (the time allowed not to exceed a half-hour). Notice:

1. The ethereal layer and the sides of the test tube remain perfectly clear in absence of cinchonidine.

2. The ethereal layer and the sides of the test tube become cloudy if cinchonidine is present.—Amer. Drugg., March 1889, 54; from Pharm. Zeitschr. f. Russl.

Lactate of Quinine—Preparation for Hypodermic Use.—Vigier communicates the following formula for making lactate of quinine:

	Grammes or parts.
Sulphate of quinine	21.35
Water	400.00
Sulphuric acid (10 per cent.)	25.00
Ammonia	15 to 20.00
Lactic acid	sufficient or 5.00

Dissolve the sulphate of quinine in the sulphuric acid and water, precipitate with the ammonia, wash, collect the alkaloid magma in the usual manner, and, while it is still moist, place it in a porcelain dish with about 100 grammes of water heated to 80° C. Now saturate it with sufficient lactic acid, evaporate the liquor to 100 grammes, and filter. Keep for use in a vial closed with a glass stopper dipped in paraffin.

The solution contains for each 5 grammes (or parts), 1 gramme (or part) of lactate of quinine, and will keep unaltered for years. The author observes that the combination is an excellent one for the purpose, but seems to have fallen into discredit because the chemical supplied by dealers is not soluble in three times its weight of water, but requires ten times its weight. The sparing solubility is owing to the use of crystallized lactate. A good plan is therefore for the pharmacist to prepare his solution according to the above formula.—Amer. Drugg., May 1889, 88; from Chem. and Drugg.

Quinine Tannate—Formula of the New Hungarian Pharmacopœia for a Tasteless Preparation.—The following formula, evidently based on Rozsnay's original formula, is given in the new Hungarian Pharmacopœia: 40 g. sulphate of quinine are dissolved in 1200 g. water with the quantity of dilute sulphuric acid exactly necessary to effect solution. To the filtered solution a solution of 80 g. tannic acid in 560 g. water is added, and this is followed by the addition of a solution of 20 g. tannic acid and 20 g. solution of ammonia in 320 g. water, the mixture being constantly stirred during these additions. After allowing the precipitate to subside for 24 hours, it is transferred to a filter, washed with 400 g. water, and

pressed lightly to remove surplus water. The pressed precipitate is then heated with 200 g. water, until it melts to a transparent, yellowish, resin-like mass, which is dried and reduced to powder. It constitutes a yellowish, nearly tasteless powder, and contains from 30 to 32 per cent. of quinine.—Arch. d. Pharm., Oct. 1888, 898; from Pharm. Centralh.

Citrate of Iron and Quinine—Alkaloid in Commercial Samples.—R. H. Davies gives the result of twenty-one experiments undertaken to ascertain the amount and precise nature of the alkaloid present in commercial samples of this preparation. The total alkaloid varied from 11.42 to 19 per cent. Upon the basis of the precipitated tartrates obtained it was inferred that some of these samples contained considerable quantities of amorphous alkaloid, and these were cases in which the preparation had been obtained from foreign sources.—Yearbook of Pharm., 1888, 410–417.

Hydroquinone—Action and Administration.—It is said (in Med.-Ch. Rund.) that hydroquinone acts best in moderate doses (30 to 50 cgm. for an adult), as it sometimes produces gastro-intestinal troubles, which obstruct its action. It acts rapidly in ileo-typhus, acute rheumatism and erysipelas, and is an antiseptic and an anti-ferment. It lowers both the pulse and the temperature, and acts upon the respiration and the arterial pressure; it also causes diuresis and diaphoresis.—Am. Jour. Pharm., Oct. 1888, 511; from Nouv. Rem., Aug. 8, 1888.

Cinchonine—Action of Oxalic Acid in Presence of Sulphuric Acid.—According to E. Carentau and Ch. Girard, by the action of oxalic acid upon cinchonine in presence of sulphuric acid, new bases are formed which are separated by treating the crude product with a large volume of water, precipitating with ammonia, collecting and drying the precipitates, and treating them with ether, in which a part only is soluble. The mass insoluble in ether is chiefly cinchonine not attacked during the operation. The ethereal solution is agitated with water acidulated with hydrochloric acid, which seizes the bases. The aqueous portion is separated, precipitated with ammonia, and the precipitate, previously drained, is treated with benzene. There exist two bases, the one soluble in ether and benzene, the other soluble in ether but insoluble in benzene.—Chem. News, July 6, 1888, 12; from Bull. Soc. Chim., xlix., No. 2.

Salicylate of Cinchonidine—Preparation.—Sherman L. Carroll prepared salicylate of cinchonidine by precipitating the alkaloid from its sulphate, dissolving it in a hydro-alcoholic solution of salicylic acid, and evaporating. The solution had a strong tendency to creep over the sides of the dish, and the salt had a reddish color. Satisfactory results were obtained on precipitating solutions of cinchonidine hydrochlorate and sodium salicylate, drying the precipitate, dissolving in alcohol, filtering through animal charcoal, and crystallizing.—Amer. Jour. Pharm., March 1889, 124.

Strychnine—Color Reactions.—Professor Flückiger refers the colors which strychnine produces with sulphuric acid and oxidizing agents (lead peroxide, potassium chromate, ammonium vanadiate, ceri-cerous oxide, potassium ferricyanide, and permanganates) to the formation of one and the same lilac or violet product, which is very unstable. A permanent and certain color is obtained with the following solution: 0.01 gm. potassium dichromate is dissolved in 5 c.c. of water, and mixed with 15 gms. (8.15 c.c.) sulphuric acid of sp. gr. 1.84 at 15°. When cold the reagent is ready for use. A solid body to be tested for strychnine is moistened with a single drop of this liquid, or the powdered solid is scattered upon the liquid on a porcelain slab, or a saturated solution of the strychnine salt is let flow slowly over the acid, shaking very gently, so as to obtain a distinct zone. Certain substances, such as brucine, give a fine red color with the chromiferous sulphuric acid, and mask the reaction of strychnine. In case of a mixture of brucine and strychnine which does not at once give the strychnine reaction, the substance is placed upon a small moistened filter, and chlorine-water is dropped upon it as long as a red color is thus produced. Dichlorbrucine is thus formed as an amorphous, easily soluble body, which passes rapidly into solution. The undissolved alkaloidal residue gives the reaction of pure strychnine. —Chem. News, March 8, 1889, 121; from Pharm. Ztg.

Strychnine—Products of Distillation with Soda Lime.—Löbisch and Malfatti obtained, by the distillation of strychnine with soda lime, besides the skatol and β methylpiridin originally obtained by C. Stoehr, a small quantity of carbazol. The quantity of the latter was, however, quite small, amounting only to 0.5 per cent. of the strychnine employed.—Arch. d. Pharm., Dec. 1888, 1127; from Monatsh. f. Chem., 9, 626.

Strychnol (Strychnine Hydrate)—Preparation.—According to "Le Monde Phar." (Sept. 5, 1888), this modification of strychnine is obtained as a white precipitate by boiling strychnine in a solution of caustic soda with alcohol, evaporating, and directing a jet of carbonic acid gas upon the residuum after dissolving it in water. The reaction of strychnine with chromate of potassium is not obtained with strychmol. With sulphuric and nitric acids, strychmol gives a bright, carmine color. Boiled in dilute acids it decomposes into strychnine and water. Its formula is $C_{21}H_{22}N_2O+H_2O$.—Amer. Jour. Pharm., Nov. 1888, 564.

Strychnine and Brucine—Quantitative Separation.—I. E. Gerock has formulated a method for the separation of brucine from strychnine, which is dependent on the difference of their behavior towards oxidizing agents, the products of the decomposition of brucine by dilute nitric acid not possessing alkaloidal properties. The picrates of these alkaloids acting like the alkaloids themselves when treated with nitric acid, the mixed alkaloids are converted into picrates by adding picric acid to the neutral solution at the temperature of the water bath; the precipitate is

collected, after standing for a short time, on a weighed filter, washed with cold water until the washings are colorless, dried at 105° and weighed. The precipitate is then transferred, as completely as possible, to a beaker, and nitric acid sp. gr. 1.056, warmed on a water bath, is repeatedly passed through the filter to decompose any unremoved brucine picrate; the nitric acid is then added to the precipitate in the beaker and this placed on a water bath for some time; by carefully neutralizing, adding a trace of acetic acid and allowing to cool, the strychnine picrate is reprecipitated, collected on the previously used filter, washed, dried, and weighed. The difference between the two weighings represents the brucine picrate (anhydrous). Control experiments agree very well.—Arch. d. Pharm., Feb. 1889, 158–162.

Hyoscyamine — Conversion into Atropine.—The investigations of A. Ladenburg having shown that the products of the splitting up of atropine and of its isomer, hyoscyamine, are the same, viz., tropin and atropic or tropic acid; and, furthermore, that by heating these products with dilute hydrochloric acid, atropine was regenerated from these products of decomposition, it being indifferent whether they were obtained from atropine or from hyoscyamine, Prof. Ernst Schmidt was led to the belief that hyoscyamine was capable of being directly converted into atropine. Experiments, which he now records, prove this to be a fact. By heating hyoscyamine for six hours at a temperature of 115° to 120° C., it is completely converted into atropine. The author had communicated this observation before the Convention of Naturalists at Wiesbaden in 1877, and now again draws attention to it to establish his claim to priority; W. Will (Ber. d. D. Chem. Ges., 21, 1717) and Chemische Fabrik auf Aktien (Pharm. Zeit., June 6, 1888), having also succeeded in converting hyoscyamine into atropine (the first named by heating hyoscyamine to 109°–110° C. in a partial vacuum, the latter by the addition of a drop of alcoholic soda solution to a solution of hyoscyamine in alcohol), but failed to give credit to the previous observation.—Arch. d. Pharm., July 1888, 617–621.

Hyoscine—Physiological Action.—According to Glèy and Rondeau, hyoscine causes dilatation of the pupil, nerve paralysis, arrestation of the heart, suppression of the salivary secretion, paralysis of the cord of the tympanum and of the excito-secretory nerve. Sleep caused by hyoscine is accompanied with great muscular agitation. The experiments were made on dogs and rabbits.—Amer. Jour. Pharm., Feb. 1889, 81; from L'Union Méd., Oct. 4, 1888.

Coca Bases—Chemistry.—Dr. O. Hesse communicates the results of his observations on the chemistry of the coca bases. He mentions that two sorts of coca leaves are now met with in commerce. The one sort is derived from *Erythroxylon Coca;* it was formerly investigated by Erdmann and Lossen, and was for some time the only material employed in the

preparation of cocaine. Subsequently a second sort came into the market, originating from a variety of *Erythroxylon* growing in Jamaica and St. Lucia, which has been regarded, though perhaps incorrectly, as a variety of the well-known coca plant, and termed *Nova-granatense.* It is chiefly this latter kind of coca that has hitherto been used in North Germany for making cocaine, this kind being that designated by the author as "Truxillo" evidently. From his investigations he considers himself justified in concluding that the "amorphous" bases from true coca consist chiefly of benzoyl compounds of an oily non-volatile base, together with some cocamine, while on the contrary, those obtained from the other kind of coca—the so-called "Truxillo" consist essentially of cocamine and the cinnamyl compounds of that oily base; also that cocamine is in both cases accompanied by another base containing two atoms less hydrogen, which he has named cocrylamine. In both cases the amorphous bases yield some hygrine, but whether it be a product or an educt he has not been able to decide.—Pharm. Jour. and Trans., April 27, 1889, 866–867; from Ber. d. D. Chem. Ges., xxii, 665.

A New Coca Alkaloid—Characters, etc.—A. Einhorn mentions that the observation recently made by Liebermann and Giesel, that all of the accompanying alkaloids of cocaine are easily converted into ecgonine (see below), had been known before by manufacturers, but had been kept secret for obvious reasons. The purpose of his present communication, however, is to call attention to a new alkaloid of coca, which he has obtained from the mother-liquors of a portion of crude alkaloids that had been converted into ecgonine by treatment with hydrochloric acid. The new alkaloid, which the author does not appear to have named, constituted small colorless crystalline needles, which melt at 220.5°, and have the composition $C_{26}H_{32}N_3O$; being thus one of the rarer alkaloids that contain 3 nitrogen atoms. Its chloride retains the chlorine with great power, failing even to react with silver nitrate. The hydrobromate of the new alkaloid ($C_{26}H_{32}N_3ClO.3Br.$) crystallizes from methyl alcohol in white star-shaped groups of prisms. It is intensely bitter.—Arch. d. Pharm., April 1889, 370–371; from Ber. d. D. Chem. Ges., 1889, 399.

Cocaine—Partial Synthesis.—Among the alkaloids associated with cocaine, C. Liebermann has described one under the name of

Isatropylcocaine, so-called because it has the structure of cocaine in which benzoic acid is replaced by isatropic acid. C. Liebermann and F. Giesel have now found that all of the alkaloids associated with cocaine will easily yield as a product of splitting up by boiling with hydrochloric acid and pure

Ecgonine. This, in its turn, is easily converted into *benzoylecgonine,* which is then transformed into cocaine by the method of A. Einhorn. To convert the ecgonine, 1 molecule in hot saturated solution with about half its weight of water is digested for about one hour, with 1 mol.

anhydrous benzoic acid gradually added. The mass is allowed to cool, shaken with ether, and the residue, which is composed of benzoylecgonine and unchanged ecgonine, is then triturated with a little water and subjected to the action of the filter pump, which removes the ecgonine. Cocaine prepared thus synthetically is characterized by perfect purity and firm, splendid crystals. It possesses the local anæsthetic power of natural cocaine, without manifesting any irritant effect.—Arch. d. Pharm., Jan. 1889, 80–81; from Ber. d. D. Chem. Ges., 21, 3196.

Cinnamylcocaine—Synthetical Preparation, etc.—C. Liebermann has succeeded in the synthetical addition of the acid radical "cinnamyl" to ecgonine by a method identical with that pursued in the synthesis of benzoylecgonine. It may be mentioned in this connection that the author proposes for the process of synthetically adding acid-radicals the expression of "*acylating*," just as in the introduction of alcohol-radicals the designation "*alkylating*" is generally used.

Cinnamylecgonine ($C_9H_{14}(C_9H_7O)NO_3$) is readily soluble in alcohol, and is precipitated from its solution by ether. When the latter is added in large quantities, the base crystallizes out in form of handsome, glassy needles, which melt at 216°. By passing gaseous hydrochloric acid into a concentrated solution of cinnamylecgonine in methyl alcohol, *cinnamylcocaine* ($C_9H_{13}(C_9H_7O)(CH_3)NO_3$) is produced. It is soluble in alcohol, in ether, in chloroform and in benzol, and crystallizes from hot petroleum ether in rosette-shaped groups of colorless needles, which melt at 121°. It is highly probable that cinnamylcocaine constitutes one of the alkaloids that naturally accompany crude cocaine, the production of a bitter-almond odor on oxidizing crude cocaine speaking for this view. Physiological experiments are being made with the new substance.—Arch. d. Pharm., Feb. 1889, 179–180; from Ber. d. D. Chem. Ges., 21, 3372.

Anisyl cocaine was also obtained by the author, *anisyl ecgonine* being first produced from ecgonine and anisic acid anhydride.—Arch. d. Pharm., March 1889, 275; from Ber. d. D. Chem. Ges., r889, 133.

Cocaine—Forensic Determination.—Mussi has experimented with a view to establishing a method for the forensic determination of cocaine, without, however, arriving at satisfactory results. Operating by the method of Stass-Otto upon the liver, kidneys, heart, blood and lungs of animals poisoned with cocaine, he could establish its presence only in the three latter, and not always in these. The cocaine appears to be decomposed rapidly in the animal organism, and even when not decomposed it is difficult to establish its identity, a conclusive and characteristic reaction of the alkaloid being at present unknown.—Arch. d. Pharm., Nov. 1888, 1042; from L'Orosi, 1888, 270.

Cocaine—Oxidation Products.—A. Einhorn had in a former paper

shown that by the oxidation of cocaine with permanganate of potassium and heat this alkaloid yields succinic acid, together with intermediate nitrogenous oxidation products. The latter have been the subject of further study. One of these is *Cocayl-benzoyl-oxy-acetic acid*, which crystallizes in large prisms and melts at 230°. By heating this in a sealed tube, with concentrated hydrochloric acid, the benzoyl group is split off as benzoic acid, and *cocayl-oxy-acetic acid* is formed, which is extremely soluble in water, crystallizes in long needles, and melts at 233°. The name *cocayl* is given by the author to the group $C_6H_7N(CH_3)$. *Cocayl-oxy-acetic acid* was also obtained by the oxidation of *ecgonine*. The author regards cocaine to be a pyridin derivative.—Arch. d. [Pharm., Jan. 1889, 80; from Ber. d. D. Chem. Ges., 21, 3029.

Cocaine—Incompatibility with Borate of Sodium.—Levaillant has observed that in mixing cocaine and borate of sodium for collyria or gargarisma he had found a precipitate of cocaine. This will disappear on the addition of a few drops of glycerin.—Amer. Jour. Pharm., Jan. 1889, 18; from Arch. de Ph., Nov. 5, 1888.

Cocaine—Toxic Effects.—Dr. Moizard reports that a child *æt.* four years took by accident 25 cgm. of cocaine. There was no immediate effect; the child went quietly to sleep. One hour afterward he awoke in frightful agony. The face was pale, respiration difficult, nausea, pains in the upper portion of the chest, formications, cramps of the limbs, and great muscular agitation. The child could get no rest, and was a prey to terrifying hallucinations. An enema with 50 cgm. of chloral, followed two hours later by one of 30 cgm., was given. The child began to get quiet. During the night it slept, but was frequently awakened by convulsive movements. On the following day it was perfectly well.—Amer. Jour. Pharm., Feb. 1889, 81; from Jour. de Méd., Dec. 1888.

Cocaine—Application to Burns in Admixture with Lanolin.—Dr. Wende recommends a mixture of cocaine and lanolin for burns. It excludes the air and quiets the pain. The cocaine should be pure and the mixture freshly prepared.—Amer. Jour. Pharm., March 1889, 137; from J. de Méd. de Paris.

Hygrine—Complex Characters.—According to O. Hesse, the hygrine of coca leaves is an individual alkaloid, having the composition $C_{12}H_{13}N$, and may be regarded as trimethylchinolin. C. Liebermann, however, finds that it is not a single substance, but that it is composed of an entire series of liquid alkaloids. Two of these have so far been studied, the one being that having the lowest, the other the base having the highest boiling point, and both of them containing oxygen.

The first of these bases has the composition $C_8H_{15}NO$, and the sp. g. at 19° is 0.940. The picrate of this base is precipitated in form of handsome yellow needles, when the base is mixed with a cold saturated

aqueous or alcoholic solution of picric acid. It is quite distinct from *tropin*, with which it has identical composition.

The higher boiling base may be distilled under ordinary pressure without decomposition. It has the sp. gr. 0.982 at 18°. From its solution in absolute ether the hydrochlorate ($C_{14}H_{24}N_2O.2Cl$) is precipitated by alcoholic solution of hydrochloric acid in form of white crystalline flakes. —Arch. d. Pharm., May 1889, 462; from Ber. d. D. Chem. Ges., 1889, 675.

Caffeine—Incompatibility with Acid Fruit Syrups in Connection with Benzoate of Soda.—Raynaud, wishing to obtain a preparation of caffeine made soluble by benzoate of soda in gooseberry syrup, found the mixture at first clear; but long, needle crystals were soon deposited upon the sides of the container, and these he found to be of benzoic acid. The remedy consists in adding a small quantity of bicarbonate of soda to solutions of caffeine previously made soluble by the addition of benzoate of soda.—Amer. Jour. Pharm., June 1889, 288; from Bull. de Ph. de Lyon; Répert. de Phar., April 10, 1889.

Caffeine—Examination of Granular Salts.—Wm. Kuder procured a sample of crystallized citrate of caffeine, which was of neutral reaction, and volatilized completely when heated on platinum foil. A solution of 0.50 gm. of this sample in distilled water was made alkaline with sodium hydrate, repeatedly agitated with chloroform, the chloroform solution evaporated spontaneously, and the crystals thoroughly dried; the weight of caffeine was 0.427 gm., corresponding to 0.466 gm. of crystallized alkaloid. Citric acid was absent.

Some of the commercial granular effervescing salts were examined in the same manner, except that one or two gm. was used for each assay, which gave for

I.	1.9	% dry alkaloid,	corresponding to	2.061	%	crystallized alkaloid.
II.	4.84	" "	"	5.28	"	"
III.	1.5	" "	"	1.628	"	"

Nos. I and II were granular citrates; No. III contained bromides.—Amer. Jour. Pharm., Jan. 1889, 9–10.

Citrate of Caffeine—Solubility.—A. W. Gerrard having experienced a frequent demand for citrate of caffeine in the practice of dispensing, endeavored to make a ten per cent. solution for convenience, but found that out of five samples purchased not one was sufficiently soluble, and none of them corresponded to the official statement that the preparation should form a syrupy solution with a little water. Using a sample prepared by himself, Mr. Gerrard met with the same difficulty. His experiments led him to the conclusion that citrate of caffeine has a mean solubility of about 1 in 30. He is therefore of opinion that the statement in

the British Pharmacopœia is a mistake that has also found its way into other works.—Yearbook of Pharm., 1888, 387–389.

Citrate of Caffeine "Old B. P." ?—A Substance Composed Simply of Caffeine.—In a paper communicated to the Br. Pharm. Conference (1888), John Moss called attention to an article represented to be "Citrate of Caffeine, old B. P.", which on examination proved to consist simply of caffeine, without a trace of citric acid. No explanation could be obtained of the designation, and evidently in dispensing such an article for citrate of caffeine, as nearly as possible twice the dose of caffeine intended would be given.—Yearbook of Pharm., 1888, 389–393.

Citrate of Caffeine—Poisonous Effects of a Large Dose.—T. Geraty describes a case of poisoning by caffeine, the sufferer being a lady, who took a dessertspoonful (equal to 200 grains) of pure citrate of caffeine in mistake for the granular effervescent form of the drug. A quarter of an hour after the reception of the poison there was semi-unconsciousness, grave depression, extreme pallor, all the muscles completely relaxed, and a decided inclination to sleep; pulsé slow, soft, and very compressible; respiration slow and sighing. Emesis was induced by apomorphine and stimulants administered, but it was more than one hour before consciousness was recovered and the faintness passed away.—Amer. Drugg., April, 1889, 74; from Chem. and Drugg.

Phenate of Caffeine—Preparation, Uses, etc.—According to A. Petit the admixture of equivalents of pure phenol and crystallized caffeine gives a true crystalline combination, which is very soluble in water. Concentrated solutions of this produce no irritation when applied to mucous membranes. For hypodermic injections a solution of 10 per cent. phenic acid, with q. s. of caffeine, may be used.—Amer. Jour. Pharm., June, 1889, 288; from Jour. de Pharm. et de Chim., April 1, 1889.

Theïne—Subcutaneous Use.—Dr. F. J. Mays recommends the subcutaneous injection of theïne in the treatment of chronic neuralgia and rheumatism. He administered it in doses of 0.02 to 0.06 gram, using the following formula for the hypodermic solution: Theïne, benzoate of sodium, āā 3.75; chloride of sodium, 0.5; aq. destill., 30.0. 0.36 gram of this solution contains 0.03 gram of theïne.—Arch. d. Pharm., May 1889, 470; from Jour. de Pharm. et de Chim., 1889, xix, 113.

Theophylline—A New Alkaloid from Tea.—A. Kossel has determined in tea, besides caffeine, a new alkaloid, existing in small quantities, to which he has given the name "theophylline." Its composition corresponds to the formula $C_7H_8N_4O_2+H_2O$, and it is therefore isomeric with "theobromine," except that the latter contains no water of crystallization—and also with the "paraxanthine" found in urine. Theophylline loses its water of crystallization at 110° C., melts at 264°, and sublimes at a higher temperature. It forms, like theobromine, an amorphous sil-

ver compound upon the addition of silver nitrate to an aqueous solution of the base. Upon heating this compound with iodide of methyl and a little methyl alcohol in a sealed tube, monomethyltheophylline, $C_8H_{10}N_4O_2$, corresponding in all of its characters, with "caffeine," was obtained.—Arch. d. Pharm., Sept. 1888, 847; from Ber. d. D. Chem. Ges., 21, 2164.

Veratrum Alkaloids—Estimation.—According to Kremel the veratrum alkaloids can be estimated by extracting 5 grams of the root with a mixture of equal volumes of chloroform and absolute alcohol; the solution is agitated several times in a separating funnel with water acidified with hydrochloric acid, the acid solution filtered, rendered alkaline with solution of potassa, and shaken in a separating funnel with three successive portions of chloroform; the chloroformic solution is evaporated in a tared beaker, dried at 100°, and weighed. From 1.3 to 1.5 per cent. alkaloids are obtained, consisting of jervine and veratroidine; white scales and microscopic prisms make up the crystalline forms.—Pharm. Post, 1889, 227.

Colchicine—Use in the Treatment of Certain Eye Affections.—Dr. Darnier recommends colchicine in certain eye affections. It is administered in pill form, each pill containing $\frac{1}{64}$ grain of the drug, of which from 1 to 2 or 4, or even 6 pills, can be taken daily. Care must be taken to instruct patients to reduce the dose as soon as intestinal derangements manifest themselves. Some patients have taken as many as 200 pills, without complaining of unfavorable symptoms.—Med. News, March 3, 1889.

Hydrastis Alkaloids—Purification, etc.—Ernst. G. Eberhardt communicates some interesting observations respecting certain hydrastis alkaloids.

Berberine Acetate, which is readily soluble in water and alcohol, has hitherto been completely neglected. It is best obtained by double decomposition between sulphate of berberine and acetate of potassium. 13.6 gm. acetate of potassium are dissolved in 120 c.c. alcohol sp. gr. 0.820, 30.0 gm. of sulphate of berberine added, and the mixture gently heated until the latter is discolored; the liquid is filtered after cooling, the filtrate evaporated at a gentle heat to syrupy consistence, and the syrup shaken with 100 c.c. of ether, which precipitates the berberine acetate. This is washed with ether and dried by exposure to air. So obtained, berberine acetate constitutes an orange-yellow crystalline powder, having the odor of acetic acid, and possibly the formula $C_{20}H_{17}NO_4(C_2H_4O_2)_2$. It loses acetic acid on exposure to air, forming less soluble basic acetates.

Berberine Sulphate.—The pure crystallized salt may be readily prepared from the amorphous commercial salt as follows: 15.0 gm. of the

sulphate are mixed with 120 c.c. of a mixture of equal volumes of water and alcohol, solution is effected by the addition of 4.0 c.c. of ammonia solution (sp. gr. 0.933), and the solution is filtered; 7.0 gm. of acetic acid (of 36 per cent.) are added to the filtrate, which is heated to the boiling point, 8.0 gm. of diluted sulphuric acid (of 10 per cent.) are added, and the mixture is set aside, when gradually the sulphate will crystallize out in tufts of needle shaped, deep orange colored crystals, which are collected, washed with alcohol, and dried at a gentle heat. The presence of acetic acid retards crystallization, and consequently secures the formation of larger and more perfect crystals.

Hydrastine.—In place of the more circumstantial methods usually recommended for obtaining hydrastin in a pure crystalline condition, the author recommends the following: The product, obtained by dissolving the crude hydrastin in dilute hydrochloric acid, and precipitating the cold dilute solution with ammonia, is dissolved in the smallest possible quantity of hot chloroform, the solution is filtered through glass wool or asbestos, and mixed with an excess of cold alcohol. The mixture of the two liquids at first remains perfectly clear; but when violently shaken or stirred with a glass rod, nearly pure hydrastin crystallizes out. By resolution in chloroform, precipitation by alcohol, and recrystallization from boiling alcohol, the hydrastine is obtained, with very small loss of alkaloid, and in a condition of sufficient purity for all practical purposes.—Pharm. Rundschau, Dec. 1888, 285–286.

Berberine—Products of Decomposition, etc.—Marfori has made a series of experiments mainly with the view of establishing the correctness of the statements of previous experimenters. He finds that the *nitrate of berberine* does not melt at 155° with evolution of red vapors, but that it remains perfectly unchanged until the temperature of 180° is reached, when on carefully increasing the heat, it carbonizes without previously melting. Berberine does not, as is stated, yield *chinolin* when heated with milk of lime. By the oxidation of berberine with dilute nitric acid, three products may be formed, either *berberinic acid*, or *bioxynitroberberine*, or Weidel's *berberonic acid*, identical with pyridinic acid.—Arch. d. Pharm., Dec. 1888, 1134; from Annal. di Chim. e de Farmacol., Sept. 1888, 153.

Berberine Sulphate—Presence of Chlorine in the Commercial Salt.—Prof. E. Schmidt states that the *berberine sulphate* of the market, even when marked *chemically pure*, was found to contain chlorine. The alkaloid *berberine* can be obtained pure by dissolving the salt in acetone and crystallizing; the resultant acetone berberine is dissolved in alcohol and decomposed by passing CO_2 through the solution; the precipitate formed consists of *pure berberine carbonate*, which if warmed in a current of hydrogen, yields the pure alkaloid.—Pharm. Ztg., 1888, 572.

Emetine—Estimation.—Lignon gives the following process for the es-

timation of emetine: Rub together 25 grams of the powdered ipecacuanha root, 25 c.c. of water, and 20 grams of slaked lime; then add 30 grams more of slaked lime, and treat the mixture in an exhaustion apparatus with 300 c.c. of ether. Make the clear ethereal solution up to 200–250 c.c., place 50 c.c. of this into a 100 c.c. flask, add 10 c.c. of semi-normal sulphuric acid, and 4 to 5 drops of freshly prepared and concentrated extract of logwood, and shake the mixture thoroughly. The yellow-colored acid layer is separated from the colorless ethereal layer, and titrated with decinormal ammonia solution, drop by drop, until it is colored red. The difference between the amount of ammonia solution consumed and that necessary for the sulphuric acid originally used, gives the data from which the amount of emetine is easily calculated.—Amer. Drugg., Aug. 1888, 143; from Chem. Ztg.

Physostigmine—Delicate Test.—In a paper on physostigmine, Eber states that chloride of gold, or the double iodide of potassium and bismuth, or the double iodide of potassium and zinc, precipitate this alkaloid even from an extremely dilute solution of the sulphate. If the precipitation is effected on a white plate or capsule, and only 0.000001 gm. ($\frac{1}{64000}$ grain) of the salt is present, the precipitate may still be recognized. This chemical test is, therefore, much more delicate than a physiological test. On placing in contact with one drop of a solution of the salt, containing the before-mentioned minute quantity, a drop of a 5-per-cent. solution of potassa or soda, a red color will be noticed at the point of contact, due to the formation of rubreserine. When the drop dries, a yellow film is left, which dissolves again with a red color in water. If baryta water is used instead of potassa or soda, a carmine color will first be produced, and this will afterwards change to blue.—Amer. Drugg., Nov. 1888, 212; from Pharm. Ztg., Aug. 15, 1888.

Eseridine—A New Alkaloid from Calabar Beans.—C. F. Boehringer & Sons have determined in Calabar beans a new alkaloid, which they have named "Eseridine," and which appears to be closely related to physostigmine (eserine), being converted into the latter by heating with diluted acids. On this ground it is advisable to effect its solutions without the aid of heat, the more particularly since its toxic effect is only one-sixth that of physostigmine. It crystallizes in large tetrahedral crystals, but is supplied also in powder. It is a powerful laxative, with but slight action upon the central organs.—Arch. d. Pharm., Feb. 1889, 135.

Sulphate of Sparteine—Physiological Action.—Dr. Pawinsky, in an elaborate study of this drug (Gaz. Lekars, 1888), arrives at the following conclusions, based (clinically) upon experiments in 33 cases. In small doses of 2 or 3 cgm. or 6 to 8 cgm. daily, it slows and strengthens the cardiac contractions, Doses of 8 to 12 cgm. or 1 gm. daily paralyze the heart-action; the pulse becomes slow, weak and arhythmic. Small doses irritate the pneumo-gastric, large ones paralyze it. Small doses augment

the tonicity of the vessels; the effect is observed in 40 minutes after ingestion. No cumulative action was observed, or gastric disturbance. The author cannot say that sparteine has a direct diuretic action, but it favors diuresis and dissipates œdema and sanguineous stasis.—Amer. Jour. Pharm., Sept. 1888, 451; from Bull. Gén. de Thérap, July 15, 1888.

Ulexine—Physical and Chemical Characters.—In a previous paper (see Proceedings 1887, 344–345), Messrs. A. W. Gerrard and W. H. Symons described the methods by which *ulexine* was obtained from *Ulex europæus*, or common furze, and pointed out its chief characters and tests. They have now made a further study of this alkaloid, and describe it as follows: Ulexine is freely soluble in chloroform, and can be best obtained in colorless, odorless crystals by evaporating its chloroformic solution. The crystals are anhydrous and remarkably soluble in water, readily deliquescing when exposed to moist air. It is insoluble in absolute ether, is a strong base, precipitating quinine, cocaine and strychnine from solutions of their salts, and even liberating ammonia from its compounds. It dissolves in nitric acid, sp. gr. 1.42, and in sulphuric acid without coloration; but if to a drop of a solution of ulexine in such nitric acid, spread out on a white tile, a drop of strong sulphuric acid be added, a yellow or red ring appears round the sulphuric acid. With ferric chloride, ulexine or its salts give a red coloration, which disappears on dilution with water. If to a solution of ulexine in chloroform bromine be added drop by drop, a nearly white precipitate, probably "monobromo-ulexine," falls. On further addition of bromine this is converted into an orange-colored body, which subsequent analysis leads the author to think may be "tribromo-ulexine." The analytical data obtained by the author lead to the formula $C_{11}H_{14}N_2O$ for the new alkaloid.—Pharm. Jour. and Trans., June 22, 1889, 1029–1030.

Parthenicine—A New Alkaloid.—C. Ulrici has discovered in a native Cuban plant,

Parthenium hysterophorus, a new alkaloid, which he has named *parthenicine*. It forms large rectangular prisms with pyramids on the four lateral sides. It is odorless, very bitter, readily soluble in water, and still more so in hot water, alcohol, ether, and chloroform. It gives color-reactions with sulphuric acid and potassium bichromate, which distinguish it. It has the power, administered in doses of 0.05 Gm. (¾ grain), of assuaging neuralgia; it has also proved useful in intermittent fever.—Amer. Drugg., Feb. 1889, 36; from Merck's Bull.

Violine—Occurrence in the Rhizome of Viola cucullata.—In 1828 Boullay isolated from the rhizome of *Viola odorata*, L., a substance which he named "violine," and which he assumed to be an alkaloid. Following the process of Boullay, with some modifications, Messrs. Fr. B.

Power and Walter M. Carr have now obtained from the rhizome of *Viola cucullata* traces of an alkaloid. The authors regard the product of Boullay to have been quite impure.—Pharm. Rundschau, Jan., 1889, 11–12.

Arecaine, Arecoline, etc.—Alkaloidal constituents of *Areca-nut*, which see under "Materia Medica."

Arganine—A New Alkaloid from Argan-nuts.—S. Cotton has completed a study of the Argan tree, indigenous to Madagascar, and known to Europe through its wood, which is used by cabinet-makers. From the argan-nut the natives express an oil which they use for culinary purposes; the cake is fed to cattle. This oil, treated with Poutet's reagent (mercury and nitric acid) thickens in about twelve hours, but does not solidify like olive oil. The nut contains about 2 per cent. of vegetable albumin; the quantity of oil in it varies from 66 to 77 per cent. Its bitter principle, though insoluble in ether, chloroform, sulphide of carbon and mineral oils, dissolves readily in alcohol of 90 per cent. and in water. It crystallizes from alcohol in small, short, brilliant prisms. With sulphuric acid it forms a definite combination, appearing in beautiful elongated prisms. Mr. Cotton has given the alkaloid the name "arganine."—Amer. Jour. Pharm., Nov., 1888, 564; from Jour. de Pharm. et de Chim., Oct. 1, 1888.

Kavaïne—An Alkaloid from Kava-Kava.—Lavialle has separated from kava an alkaloid which he has named kavaïne. He exhausted pulverized kava root with alcohol of 60 per cent., and distilled to the density of a fluid extract. He added distilled water to precipitate the resin, filtered the liquor, and neutralized it with ammonia. He then agitated it with ether, adding sulphuric acid, drop by drop, until he obtained a slightly acid reaction. The liquor, on standing 24 hours, deposited crystals which were washed several times with 95 per cent. alcohol. The sulphate of kavaïne is soluble in an equal part of water at 15° [59° F.], sparingly soluble in alcohol, and insoluble in ether. It appears in prismatic crystals which deliquesce slightly on exposure to the air.—Amer. Jour. Pharm., March 1889, 136; from L'Union Pharm., Jan. 1889.

Imperialine—A New Alkaloid.—K. Fragner has isolated from the bulbs of *Fritillaria imperialis* an alkaloid to which he has given the name "imperialine." The pure base crystallizes in short, colorless needles, is sparingly soluble in cold water, soluble in cold alcohol, more so in hot alcohol, and particularly soluble in chloroform. Heated it becomes yellow at 240° and melts perfectly at 254°. Its composition corresponds to the formula $C_{35}H_{60}NO_4$. The *hydrochloride* is very soluble in water and very bitter. The *sulphate* is very hygroscopic, and was not obtainable in crystals. Triturated with sulphuric acid, imperialine produces an orange-yellow color on addition of a fragment of nitre or of potassium chlorate, and if previously heated it produces a dark red-yellow color;

with hydrochloric acid the alkaloid produces strong fluorescence, and when heated a brown-green color, changing after a time to brown-red. Physiologically imperialine exercises action upon the heart. Arch. d. Pharm., Feb. 1889, 178–179; from Ber. d. D. Chem. Ges., 21, 3284.

Alkaloids from Cod Liver Oil—Characters.—Messrs. Gautier and Mourgner have continued their investigation of the alkaloidal constituents found by them in *cod liver oil* (which see under "Materia Medica"). They state that, after having separated, by distillation, the volatile alkaloids from the mixture of the crude bases liberated from their oxalates by an excess of potassa, there remains a brown matter which yields to ether fatty matter, etc., and the fixed alkaloids. The ethereal extract is slowly but almost completely soluble in weak hydrochloric acid. The resulting solution containing two hydrochlorates is treated with platinic chloride, which throws down an orange-yellow precipitate, only soluble with heat, while the chloroplatinate of the other base remains in solution.

Aselline, ($C_{25}H_{32}N_4$), in its free state, is a nearly colorless amorphous mass when kept in the dark, acquiring a greenish tint on exposure to light, not hygroscopic, and about the spec. grav. 1.050. It melts to a yellowish viscid liquid of an aromatic odor "resembling that of the ptomaines." It is almost insoluble in water, but imparts to it a slight bitterness and feeble alkaline reaction. It is soluble in ether, and still more so in alcohol. With acids it forms crystallizable salts, which are partially dissociated by hot water. This alkaloid exists in cod liver oil only in very minute proportion. It is a very active substance, however; 3 milligrammes of its hydrochlorate causing the death of a greenfinch (verdier) in 14 minutes.

Morrhuine ($C_{19}H_{27}N_3$).—This alkaloid is extracted from the mother-liquid remaining after the preceding one has been precipitated with platinic chloride. In its free state it is a very thick, oily liquid, of an amber color, and an agreeable odor, recalling that of lilacs. It is lighter than water and easily soluble therein. Its best solvents are alcohol and ether. It has a strongly alkaline reaction, and leaves a caustic impression upon the tongue. On exposure to air it absorbs carbonic acid. Morrhuine constitutes one-third of all the basic principles contained in cod liver oil. A tablespoonful of the latter contains about 2 milligrammes of morrhuine, which is a quantity not without effect. Morrhuine has the power to excite the appetite, and is also a diaphoretic and powerful diuretic.—Amer. Drugg., Feb. 1889, 32; from Jour. de Pharm. et Chim., Dec. 1888, 535.

Alkaloids of Urine—Characters, etc.—J. L. W. Thudicum describes the method by which he obtained the following constituents of human urine.

Omicholin has approximately the composition $C_{24}H_{38}NO_6$, and is a red, resinous substance, insoluble in ammonia, but soluble in ether and alcohol. Its solution shows a bright green fluorescence, and gives an absorption-spectrum consisting of a band between D and E.

Omicholic acid has the composition $C_8H_{22}NO_4$, and is also a resinous, red substance soluble in ether or alcohol, forming a solution which shows a green fluorescence and gives an absorption-band between D and E. This band is, however, narrower than the band given by omicholin. Omicholic acid is soluble in ammonia, and is reprecipitated by acids.

Uropittin was not obtained pure. It is always mixed with one or other of its modifications, *meta-uropittin* and *uro-rubin*, and is partially altered by contact with the oxygen of the air. It contains 11 per cent. of nitrogen. Its alcoholic solution is red, and gives an absorption-band at F.

Uromelanin has the composition $C_{36}H_{43}N_7O_{10}$, and is insoluble in alcohol or ether, but dissolves in dilute solutions of the alkalis, from which it is precipitated by acids. With silver, barium, calcium, lead, and zinc, it forms basic and acid salts. The silver salt has the composition $C_{36}H_{40}AgN_7O_9$. Uromelanin is a very stable substance; the quantity excreted by an adult is 0.3 to 0.5 gram per day.

Neither urochrome nor any of the other products can be obtained crystallized. *Urochrome* is an alkaloid, the function of which is as yet unknown. The products of its decomposition are not related to the coloring matters of the blood or of the bile.

If the filtrate from the urochrome iron precipitate is concentrated, it yields bulky crystals, which may be purified by recrystallization from alcohol. These consist of an alkaloïd, *uro-theobromine*, isomeric with ordinary theobromine. It sublimes without change, forms no crystalline precipitate with silver nitrate, and displaces acetic acid from cupric acetate, forming an insoluble compound.

Creatinine is also present, and the mother-liquor from the creatinine contains three alkaloïds. *Reducine*, $C_{12}H_{26}N_6O_9$ or $C_6H_{11}N_3O_4$, forms a barium compound which is almost insoluble in alcohol. Neutral or acid solutions of reducine reduce ferric, cupric, or mercuric salts to ferrous, cuprous, or mercurous salts respectively, and silver salts to metallic silver. *Para-reducine* unites with zinc oxide to form a compound, $C_6H_9N_3O.ZnO$ or $C_6H_9ZnN_3O_2$. *Aromine* could not be isolated in a pure condition. When heated it gives off an aromatic odor resembling that obtained from tyrosine under similar conditions.—Jour. Chem. Soc., Oct. 1888, 1119; from Compt. rend., cvi, 1003–1006.

Piperidine—Existence in Pepper.—William Johnston announces the discovery of a volatile alkaloid in pepper possessing strong alkaline properties. The analysis of its platinum salt leads to the formula $2(C_5H_{11}N\ HCl)PtCl_4$. These results agree with the formula of *piperidine*, which he thinks he is justified to announce as existing in pepper. The author has made several estimations of this volatile alkaloid in various peppers, and finds that nine samples of black pepper gave an average of 0.56 per cent., with a minimum of 0.39 per cent. and maximum of 0.77 per cent. calculated as piperidine. Long pepper contains 0.34 per cent., and

pepper refuse composed principally of the husks, 0.74 per cent. Three samples of white pepper gave respectively 0.34, 0.21, and 0.42 per cent., showing that the alkaloid is contained principally in the husk, and which naturally accounts for the greater pungency of black pepper over that of white pepper.

The same samples of black pepper were examined for piperine and the amount estimated, giving a maximum of 13.03 per cent., a minimum of 5.21 per cent., and a mean of 8.25 per cent.—Chem. News, Nov. 16, 1888, 235.

Piperidine—Formation of Coloring Compounds.—B. Lackowicz has found that all quinones, such as benzo-, tolu-, naphtho- and phenanthren-quinone react upon piperidine with the production of coloring matters. Upon the addition of an excess of piperidine to an alcoholic solution of benzo quinone, an immediate reaction occurs. The product of the reaction separates from the reddish-brown fluid in form of reddish-violet columnar crystals, having a strong blue metallic lustre. The coloring compound is insoluble in water, but readily dissolved by cold concentrated hydrochloric acid. Recrystallized from alcohol—in which it dissolves with a blood-red color, while its acid solution has a carmine red color—the new coloring melts at 178° C.—Arch. d. Pharm., Oct. 1888, 946; from Monatsh. f. Chemie, 9, 505.

Nicotine—Quantitative Determination by the Polariscope.—Max. Popovici describes a method for the determination of nicotine from tobacco, which is dependent upon its relation to polarized light. The results are claimed to be as accurate as those obtained by Kimling's method, and more expeditious. The author's paper is communicated to Zeitsch. f. Physiol. Chem., xiii, 5, and an abstract is given in Arch. d. Pharm., June 1889, 558–559.

Acid Tartrate of Nicotine—Advantages, etc., over the Free Alkaloid.—Dr. H. Dresser has found the acid tartrate of nicotine to be preferable for physiological experiments to the free alkaloid, whose solutions easily resinify and decompose. The acid tartrate was, moreover, selected because of the difficulty to obtain the better known nicotine salts in crystalline form, a matter which is comparatively easy in the case of the salt under consideration. It was prepared from the pure alkaloid and a concentrated solution of tartaric acid in alcohol, precipitating the salt completely with ether, dissolving the precipitate in a little boiling alcohol, and allowing the filtrate to cool slowly, by which means the impurities separate out first and are removed; the separation of the alkaloidal salt is made complete by the cautious addition of ether. The salt has the formula $C_{10}H_{14}N_2(C_4H_6O_6)_2 2H_2O$, forms white crystalline needles, easily soluble in water, the solution possessing an acid reaction.—Arch. d. Pharm., March 1889, 266–270.

Hydroxylamine—Possible Utility in Medicine.—Therapeutic experiments have been made with the hydrochlorate and ammonium hydrochlorate of hydroxylamine—used as reducing agents in photography—which point to the possible usefulness of these compounds as substitutes for pyrogallic acid and for chrysarobin in dermatology. While having as strong reducing properties as these, it possesses the advantage of not staining the skin, the linen and the bandages.

C. Schwarz observes that hydrochlorate of hydroxylamine may contain as impurities, resulting from the method of its preparation, free hydrochloric acid, iron, chloride of ammonium, and chloride of barium. The last three are determinable in the usual manner, but free hydrochloric acid cannot be determined with litmus, because the salt itself has an acid reaction. It is therefore to be tested with normal alkali, using phenolphthalein as indicator. The determination of hydrochlorate of hydroxylamine itself depends upon its reaction with iodine, which under formation of hydriodic acid, resolves this salt into nitrous oxide, water and hydrochloric acid in equivalent proportions.—Arch. d. Pharm., Dec. 1888, 1086; from Pharm. Ztg., 1888, 659.

Hydrochlorate of Hydroxylamine—Application in Quantitative Analytical Work.—Alexander Lainer recommends this salt, which is now obtainable at reasonable prices, for the separation and determination of silver from its different combinations. It produces in a solution of silver nitrate a white precipitate, which, on the addition of caustic potassa or soda, is decomposed under lively disengagement of gas, and metallic silver is formed. This is collected, dried, heated to redness and weighed. Similarly the hydroxylamine salt may be employed for the separation of silver from its compounds with chlorine, bromine, iodine, the cyanide, etc.—Arch. d. Pharm., Oct. 1888, 946–947.

Isochinoline—Products of Oxidation.—G. Goldschmidt has subjected isochinoline, as well as its addition products with ethyl bromide, benzyl chloride and phenacyl bromide, to oxidation with permanganate of potassium, and found that under these conditions imides of phtalic acid are formed. The reaction is typical for isochinoline, and may therefore serve for the identification of the isochinolin radical in alkaloids. Experiments with different alkaloids are now being made by the author, with a view to establishing their exact chemical relations.—Arch. d. Pharm., Dec. 1888, 1128.

Acet-ortho-amido-chinoline—Characters.—G. M. Kyritz has succeeded in obtaining "acet-ortho-amido-chinoline after an extended series of experiments. As a preliminary to a lengthy paper to be communicated hereafter, the author states that this body possesses in respect to its melting point (102.5° C.) and boiling point (300° C.) as well as in its relation to solvents, the greatest analogy to antifebrin. It may be distilled unchanged, and has an elementary composition corresponding to the

formula: $C_{11}H_{10}N_2O$. It may be resolved into its components both by the action of concentrated potassa solution and by concentrated acids.—Arch. d. Pharm., June 1889, 548.

Antipyrine—Reactions.—Yacoubian observes that antipyrine produces a red color with a mixture of nitric and sulphuric acids. The same reaction is produced if this acid mixture is added to an alcoholic solution of the base. If then a few drops of water are added, a green precipitate, insoluble in water, is produced. In a solution of antipyrine in ether-alcohol, these reactions do not occur until the ether has evaporated.—Arch. d. Pharm., Sept. 1888, 851; from Jour. de Pharm. et de Chim., 1888, xviii, 152.

Antipyrine—Characteristic Test.—A. Campbell Hark suggests that the well-known reaction between nitrous acid and antipyrine can be utilized as a test for the latter, as follows: Place in a test-tube a few grains of potassium nitrate (nitrite? Rep.), add a little water, then an excess of strong sulphuric acid, and fill the tube with the suspected liquid. A green coloration is immediately produced if antipyrine is present. This test is delicate and reliable, and has the advantage of being specifically characteristic of antipyrine.—Pharm. Jour. and Trans., May 25, 1889, 949.

Antipyrine—Incompatibility with Salicylate of Soda.—P. Vigier finds that if antipyrine and salicylate of soda are mixed dry, as for cachets, an oily body forms within a few hours, thus injuring the powder or cachet, and showing in fact an undesirable decomposition. The reaction of the formed substance is alkaline. The reaction of aqueous solutions of these bodies is, when united, slightly acid. Mixed solutions of antipyrine and salicylate of soda remain limpid indefinitely and without apparent change.—Amer. Jour. Pharm., June, 1889, 288; from Répert. de Phar., May 10, 1889.

Antipyrine.—Influence to increase the solubility of *quinine salts*, which see.

Exalgine (Orthomethylacetanilide)—A New Substitute for Antipyrine.—Dujardin-Beaumetz and Bardet call attention to exalgine, the effects of which they find to bear a strong resemblance to those obtained from antipyrine; but exalgine acts more decidedly upon the sensibility and less upon the nervous centres. Therapeutically, the analgesic effects of exalgine may be obtained in single doses of 25 cgm. to 40 cgm.; or, from 40 cgm. to 75 cgm. may be taken daily in two doses. The analgesic action appears to be superior to that obtained from antipyrine, even in all forms of neuralgia, visceral neuralgia included. Exalgine is eliminated by the kidneys and diminishes the amount of sugar in the urine. It is antiseptic, antithermic and analgesic, the latter action predominating.—Amer. Jour. Pharm., May 1889, 243; from Nouv. Rem., March 24, 1889.

Diphenylmethylpyrazol—A New Substitute for Antipyrine.—According

to "Ztschr. f. Angew. Chem.," diphenylmethylpyrazol, analogous in composition with antipyrine, and used for the same purpose, is made by the action of benzoyl-acetic ether upon phenyl-hydrazine and then introducing the methyl group. It forms white needles melting at 150°, is difficultly soluble in water and ether, easily soluble in alcohol and glacial acetic acid, and differs from antipyrine in being a strong base; also in the reactions with nitric acid and with ferric chloride, these not being so characteristic—Pharm. Centralh., 1888, 463.

Acetanilid—Determination in Phenacetin.—According to Schroeder the presence of acetanilid in phenacetin to the extent of two per cent. may be proven by boiling 0.5 gm. in 5–8 c.c. water, allowing to cool, filtering, adding to the filtrate dilute nitric acid and a little potassium nitrite, boiling, adding several drops nitroso-nitric acid and again boiling; a distinct red color appears in presence of acetanilid.—Pharm. Ztg., 1889, 57; from Ned. Tydschr. Pharm.

Phenacetin—Various Products Introduced Under This Name.—According to Dujardin-Beaumetz several entirely different bodies have been introduced into commerce under the name of phenacetin:

1. *Meta-acetphenetidin*, described by Wagner, melting at 97° C.
2. *Para-acetphenetidin*, melting at 130°–135° C.
3. *Ortho-acetphenetidin*, melting at 79° C.

The last named is the most soluble in alcohol, the second less soluble. The para and ortho-compounds are physiologically active in doses of 0.5 gram, while the meta-compound is nearly inactive.—Arch. d. Pharm., Aug. 1888, 751; from Jour. de Pharm. et. de Chim., 1888, xvii, 634.

Phenacetin—Detection of the Presence of Antifebrin.—E. Hirschsohn finds that antifebrin, if present in phenacetin to the extent of five per cent. or more (see also Proceedings 1888, 578) can readily be identified by making a saturated aqueous solution, and adding to this half a volume of bromine water. Antifebrin decolorizes the bromine water immediately, and in a few moments a crystalline precipitate appears. Phenacetin neither decolorizes the bromine water nor gives the precipitate, which is supposed to be acet-parabromanilide, and is almost insoluble in water.—Pharm. Ztschr. f. Russl., 1888, 794.

Phenacetin—Color—Reaction with Chlorine.—A writer in "Arch. de Pharm." (Dec. 5, 1888) states that chlorine water gives the aqueous solution a red-violet color which soon passes to ruby red. A solution of chloride of lime will give the same reaction.—Amer. Jour. Pharm., Jan. 1889, 18.

Methacetin—A New Antipyretic.—F. Mahnert calls attention to "methacetin," a new antipyretic, which is a lower homologue of phenacetin, having the formula $C_6H_4\left\{\begin{matrix}OCH_3\\NHC_2H_3O,\end{matrix}\right.$ and is prepared in an

analogous manner. Para-nitrophenol is first prepared by action of nitric acid upon phenol; the sodium salt reacting with methyl chloride forms sodium chloride and nitranisol; by treatment with nascent hydrogen the nitranisol is reduced to anisidin (para-amidoanisol), which by boiling with glacial acetic acid is converted into *acetyl-anisidin* or methacetin. It forms a faint reddish crystalline powder, is odorless, has a saline bitter taste, is easily soluble in water and alcohol, and melts at 127°. Methacetin possesses preservative and antipyretic properties. The dose for children should not exceed 0.3 gm., the smaller dose compared with phenacetin is due to its solubility, and hence easier absorption; after its use the urine gives the para-amidophenol reaction (in HCl solution with calcium hypochlorite a violet color, on agitation changing to green) and has reducing action which is not due to the presence of sugar.—Pharm. Ztg., 1889, 228.

Hydracine—Preparation and Characters.—According to Th. Curlius and R. Jay, *tri azoacetic acid*, when heated with water or a mineral acid, is split under assimilation of 6 mol. of water into the diamide "hydracine" and oxalic acid, the latter again being split more or less completely into carbonic and formic acid. When water alone is used for the decomposition, formate of hydracine is formed, while when a mineral acid is used a salt of that acid results. By suitable agents, described by the author, hydracine may also be produced from di-azoacetic ether. Hydracine has a strong affinity for water, forming

Hydracine hydrate ($N_2H_4+H_2O$), and this hydrate is produced direct on precipitating one of its salts by an alkali. It constitutes a strongly refractory, fuming liquid, which boils at 119° without being changed, and from which the water may be removed by fractional distillation. It exercises strong poisonous action upon the lower animals. With acids it readily forms very stable salts, which may contain one or two molecules of monobasic acids. These are powerful reducing agents, nitrogen and water being formed. When heated by themselves they are decomposed with formation of ammonium salts, nitrogen and hydrogen. They are almost insoluble in alcohol. The

Hydrochlorate of Hydracine is obtained in form of large, shining octahedrons, readily soluble in water, which melt at 198°, giving off 1 mol. hydrochloric acid, and forming *hydracine* monohydrochlorate. By prolonged heating to 240°, it is decomposed into chloride of ammonium, nitrogen and hydrogen. The

Sulphate of Hydracine ($N_2H_4.H_2SO_4$) crystallizes in thick, glassy, glistening anhydrous plates, or long, thin prisms, which are difficultly soluble in cold water, easily in hot water, insoluble in alcohol.

Formate of Hydracine ($N_2H_4.2CH_2O_2$), obtained by heating tri-azoacetic acid with water, is formed in form of small white needle-shaped

crystals by adding alcohol to the aqueous solution. The author also prepared the *carbonate*, *oxalate* and *nitrate of hydracine*.—Arch. d. Pharm., March 1889, 272–273; from. Jour. f. prakt. Chem., 1889, 39, 27.

Acetylphenylhydrazide—Dose, etc.—According to Prof. O. Liebreich, pure acetylphenylhydrazide is reported by Prof. Dreschfeld to have an antipyretic power four times as great as that of pyrodine. Consequently the doses which Dreschfeld has indicated for pyrodine (2 to 4 grains for children, and 8 to 11 grains for adults) would be too large for acetylphenylhydrazide.

Liebreich gives the doses of the last-named substance as follows:

For children	½ to 1 grain.
For adults	2 to 3 grains.
Highest dose for adults and per day	4 grains.

It follows from this, that pyrodine and acetylphenylhydrazide are not identical, and that the latter may only be dispensed, if it is prescribed under this name.—Pharm. Zeit.

Acetphenylhydrazin—Difference from Pyrodine.—According to the investigations of Prof. Dreschfeld, acetphenylhydrazin if pure is four times as active as pyrodine, the dose being, for adults, 0.12–0.18 gm. (2 to 3 grains). These two substances, hence, are not, as generally believed, identical, pyrodine being a crude product containing acetphenylhydrazide.—Pharm. Ztg., 1889, 15; from Therap. Monatsh.

Pyrodine—A New Antipyretic.—Under the name of "pyrodine," a new antipyretic is introduced by Ad. Liebmann, which as its active ingredient contains

Acetylphenylhydrazine ($C_6H_5.N_2H_2.C_2H_3O$).—It is a white, tasteless substance, a crystalline powder, very sparingly soluble in cold water, possessing very little taste, and thus easily administered in powder form. J. Dreschfeld has made experiments upon the physiological effects of the new substance, which are briefly summed up as follows:

1. Pyrodine is a powerful antipyretic.

2. It reduces fever temperature quickly, and maintains the temperature at a low level for some hours.

3. It is easily taken, and produces marked perspiration, but not nausea, vomiting or collapse.

4. It is especially applicable in cases of pneumonia, scarlet fever, and typhus. Given in small doses in the latter disease, it enables the patient to pass through the fever at a low temperature range without delaying the crisis, and it seems also to shorten the period of convalescence.

5. It is less applicable in cases of typhoid, owing to the early exhibition of toxic symptoms.

6. It appears to act equally well in migraine and neuralgia, but observations are not extensive enough yet.

7. Given in often repeated doses at short intervals, it easily shows toxic properties, and these depend on the action of the blood, producing hæmoglobinæmia. It should not be given (unless the temperature be very high) oftener than once in 18 or 24 hours, and it is not safe to continue its use for more than a few days.

8. It is found to act in cases where the other antipyretics have failed.

9. The dose for children is 2–4 grains; for adults, 8–12 grains.

10. It is much more antipyretic than either antipyrin, antifebrin, or phenacetin, but it is also much more toxic than these bodies.

This disadvantage is reduced by the fact that it is rarely necessary to give more than one dose in 12 to 18 hours, as the temperature is kept low for a longer period than if any of the other antipyretics are used.

11. It reduces the pulse as well as the temperature, and often causes diuresis.—Amer Drugg., Feb. 1889, 33; from Med. Chron., 9, 89.

Pyrodine—Proper Dose.—The proper dose of the new antipyretic, pyrodine, which is said to be useful in pneumonia, scarlatina, typhoid fever, migraine and the neuralgias, is given by the Bull. Méd. as follows: For children, the quantity to be given daily should be from 10 to 20 cgm.; for adults, 40 to 60 cgm. It should not be given oftener than every 18 or 24 hours. Administered repeatedly at short intervals, it gives rise to toxic symptoms. It is said to be a powerful antiseptic as well as an antipyretic. Dr. Lepine proposes to call it phenacethydrazine, as, under its present name, it is likely to be confounded with pyridine.—Répert. de Phar., January 10, 1889.

Aniline—Compounds with Chloric and Perchloric Acids.—Ch. Girard and L. L'Hote describe the compounds obtained by the action of chloric and of perchloric acid upon aniline. The

Aniline Chlorate may be obtained by the direct action of chloric acid upon aniline, but on a large scale is made by double decomposition between hydrochlorate of aniline and chlorate of sodium. To a solution of 100 grams of the aniline salt in 200 grams of water, pure aniline is carefully added, drop by drop, until completely neutral to test-paper, and a solution of 82 grams of chlorate of sodium in 125 grams of water is then added. A crystalline mass is thus produced, which is collected in a funnel kept ice cold, and washed with a little distilled water until the drippings no longer give a reaction with silver nitrate. The salt is rapidly dried, is easily soluble in water, and is decomposed with flame on addition of fuming nitric or sulphuric acid, while ordinary nitric or hydrochloric acid simply decomposes it with formation of brown products and no flame.

Perchlorate of Aniline can also be obtained by the direct action of perchloric acid upon the base, but better by double decomposition between

a solution of 30 grams of sodium perchlorate in 15 grams of water, and of 30 grams of hydrochlorate of aniline, neutralized with aniline accurately, in 60 grams of water. The salt is obtained in form of glistening scales, which are not changed in air at the ordinary temperature. When heated it undergoes combustion and leaves a carbonaceous residue. Ordinary concentrated nitric or sulphuric acid does not act upon this salt in the cold; fuming nitric acid decomposes it with inflammation; at 100° colored products of decomposition are formed by ordinary nitric acid, and by the action of ordinary sulphuric acid, at that temperature, perchloric acid vapors are given off.—Arch. d. Pharm., May 1889, 477; from Jour. de Pharm. et de Chim., 1889, xix, 250.

Aniline—Poisonous Action.—Dr. Dehio describes a case of poisoning by a 10 gram dose of aniline taken by a young woman. The symptoms quickly manifested were cyanosis, acceleration of pulse, dilation of the pupils and aniline odor of breath. The immediate effects on the nervous system were shown in 24 hours by coma, absence of cutaneous reflexes and voluntary motion, quick pulse (132), increased respiration (25), and profuse transpiration, the latter occuring 30 hours after ingesting the poison. Besides the purely nervous symptoms there was an abnormal coloration of the skin. Twenty-one hours after ingestion the urine contained traces of the colorants of the bile (hæmaglobinuria), and the serum was yellowish-red; from the second to the fifth day the urine contained more and more biliary pigment; on the third day an icterus appeared, which lasted until the ninth. Convalescence returned with the disappearance of hæmoglobinuria. Aniline may be classed with those poisons which produce the latter condition simultaneously with icterus.—Amer. Jour. Pharm., Nov., 1888, 363; from Bull. Com., Sept. 1888.

Diamidophenylacridin nitrate (Crysanilin nitrate, "Phosphin")—Physiological action.—Dr. Dujardin-Beaumetz has subjected this compound, known commercially under the misleading name of "phosphin" to physiological experiment. Given to rabbits internally it produces no material effect; but when administered hypodermically (0.5 gram. for 1 kg. of the weight of the animal) it rapidly produces death. On man, it produces in small doses a certain excitement, followed by depression, analgesy and reduction of temperature, and in doses over 1 gram it produces emesis. Arch. d. Pharm., Aug. 1888, 751; from Jour. de Pharm. et de Chim., 1888, xviii, 41.

Phenolphthalein—Necessity to Neutralize its faint Acidity.—A. Gawalowski has made the observation that phenolphthalein usually has a very faint acid reaction. This is shown by the fact that if it is dissolved in alcohol absolutely free from any acid trace, it will bear the addition of several drops of normal potassa solution per gram of phenolphthalein. Only when the faint acid trace has been completely neutralized, will the

red color make its appearance upon adding more of the alkali.—Amer. Drugg., July 1888, 127; from Zeitschr. Anal. Chem.

Safranin—Use as a Reagent for Glucose, which see under "Carbohydrates."

Vermillionette—A New Coloring Matter from Eosine.—The following method of obtaining a new coloring matter from eosine is given in "Monit. Sci.:" In an aqueous solution of eosine, minium is placed in suspension and briskly agitated, while adding a solution of acetate or nitrate of lead until the color is wholly precipitated. Wash, press, and bolt. The color is very brilliant, but, like all eosine colors, it fades under the influence of light.—Amer. Jour. Pharm., June 1889, 17; from Jour. de Phar. et de Chim., Nov. 1, 1888.

Aldehyd-Blue—A New Coloring Matter.—By the action of paraldehyd upon pararosanilin in the cold, L. Gattermann and G. Wichmann have obtained a new blue coloring matter, which separates as a dark blue powder, acquiring a handsome bronze tinge when triturated. It is easily soluble in water and in alcohol, but insoluble in ether, benzol, lignin, etc., and has not been obtained in crystals. In its empirical formula it corresponds to a chinaldin ($C_{10}H_9N$), but its picric acid compound leads to the assumption that it is a poly-chinaldin, i. e., *trichinaldin* $(C_{10}H_9N)_3$. The aldehyd-blue shows throughout the characters of the fuchsin coloring matter.—Arch. d. Pharm., April 1889, 366; from Ber. d. D. Chem. Ges., 1889, 227.

Methyl-Orange—Variability and Consequent Unsatisfactory Application as an Indicator.—D. B. Dott observes that methyl-orange (dimethyl-aniline-orange), which seems to have taken a permanent place among indicators in alkalimetrical processes because it is not affected like litmus and phenolphthalein by carbonic acid, is a poor indicator for organic acids and not very satisfactory for phosphoric acid; but in addition to these defects it occurs of variable quality in commerce, from which cause the end-reaction may be quite obscure or indistinct, even in the case of the other mineral acids. He prefers to use litmus.—Pharm. Jour. and Trans., April 20, 1889, 849.

Methyl-Orange—Characters and Special Value as an Indicator.—Alfred H. Allen, referring to Mr. Dott's strictures upon the value of methyl-orange as an indicator, observes that, like phenolphthalein, methyl-orange has its own particular uses, and for some of these cannot be replaced by litmus. That the methyl-orange of commerce should be of variable quality is a very serious disadvantage, but he has personally never met with faulty specimens, having used from the original stock for years past; but in order that the genuine or defective nature of specimens of methyl-orange may be recognized, he gives the following description of the coloring matter in question:

Methyl Orange, or Helianthin, Poirrier's Orange III, Tropopæolin D, Gold-Orange and *Mandarin-Orange,* is the sodium or ammonium salt of dimethyl-amido-azobenzene-sulphonic acid, a body produced by the action of dimethyl-aniline on diazobenzene-sulphonic acid, and having the formula $\left.\begin{matrix} C_6H_4 \\ SO_3Na \end{matrix}\right\} N : N.C_6H_4N \left\{\begin{matrix} CH_3 \\ CH_3 \end{matrix}\right.$. It constitutes an orange-yellow powder, which is readily soluble in hot water, but sparingly in alcohol, its aqueous solution being orange-yellow, and not precipitated by alkalies. On adding hydrochloric acid to a hot concentrated aqueous solution, the free sulphonic acid is precipitated in microscopic needles, which soon change to small, strongly lustrous plates or prisms having a violet reflection. Concentrated sulphuric acid dissolves it with a reddish or yellowish-brown color, the solution appearing yellow in thin layers. On copious dilution the liquid becomes a splendid red. The solution is precipitated by barium chloride, but not by calcium chloride. Basic acetate of lead throws down the whole of the coloring matter as an orange-yellow precipitate. Magnesium sulphate added to a dilute solution of methyl-orange (helianthin) precipitates the coloring matter in microscopic crystals. Silk and wool when immersed in the acid solution of this coloring matter are dyed a fiery orange. The dyed fibre is turned red by hydrochloric acid, and yellow by strong sulphuric acid, but alkalies produce no change. The yellow color which methyl-orange imparts to aqueous and alcoholic liquids is changed to red by a powerful acid, but is wholly unaffected by weak acids, among which the following, carbonic, hydrocyanic, hydrosulphuric, arsenious, silicic, boric, oleic, stearic, palmitic, carbolic, etc.; with oxalic, acetic, butyric, succinic, lactic, tartaric, and citric acids, inaccurate results are obtained. Of the powerful acids, hydrochloric, sulphuric, and nitric acids give sharp end-reactions, but in the presence of nitrous acid, or of a nitrite, it is not applicable as an indicator, these compounds decomposing it. The following salts are neutral to methyl-orange, and hence their formation is an end-point of titration in which they are produced: $Na_2S_2O_3$, $KaHSO_3$, NaH_2PO_4, $CaH_4(PO_4)_2$, NaH_2AsO_4, $K_2Cr_2O_7$. It can be used to detect free acid in alum, ferrous sulphate, cupric chloride, etc. The earthy carbonates in hard water may be at once determined by titrating the filtrate with a mineral acid and methyl-orange. The acid radical (and consequently the metal equivalent thereto) in copper sulphate and similar salts can be determined with great accuracy by precipitating the solution with sulphuretted hydrogen, filtering, and titrating the filtrate with standard alkali and methyl-orange. The author evidently prefers to call this coloring matter by the alternative name

Helianthin, because of the existence of the allied dyes named "Orange I," "Orange II," "Orange IV," etc., and it is possible that these may have been supplied instead of helianthin. Thus,

Orange I, or "α-naphthol yellow," gives a yellowish brown coloration or flocculent precipitate with hydrochloric acid, and is changed to red-brown by caustic alkalies.

Orange II, or "β-naphthol-orange," gives a brownish-yellow precipitate with hydrochloric acid, and the solution is changed to brownish-red by alkalies.

Orange III, as previously mentioned, is one of the synonyms applied to methyl-orange, and patented under that name by Roussin and Poirrier.

Orange IV, or "diphenylamine yellow," behaves much like helianthin, but is far less sensitive to acids. It may, according to Engel, be distinguished from helianthin by gold chloride, which is turned violet and then green by Orange IV, but becomes red by helianthin.

If any doubt be entertained respecting the purity of methyl-orange, or helianthin, it may be purified by precipitating the hot concentrated solution with hydrochloric acid. The dimethyl-amido-azobenzene-sulphonic acid, after being washed, can then be dissolved in ammonia. Possibly its purification might be accomplished by taking advantage of its precipitation with magnesium sulphate.

The author makes some remarks respecting the value of the special application of helianthin, as well as of *phenolphthaleine*, as indicator, for which reference must be had to the original paper as communicated to Pharm. Jour. and Trans., May 11, 1889, 902–904.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Salicin—Proper Doses in the Treatment of Rheumatism.—According to Dr. McLagan, salicin must be given in large doses in rheumatism, from 20 to 40 grains every hour, until there is decided evidence of its action. Generally before an ounce is given improvement has taken place, and as the symptoms decline the dose may be diminished.—Amer. Jour. Pharm., Nov. 1888, 546; from "The Lancet."

Helleborein—Local Anæsthetic Action.—Messrs. Venturini and Gasparini refer to helleborein as having a very energetic cardo-toxic action. Experiments made with animals lead them to the conclusion that greatly diluted solutions of helleborein induce complete corneal anæsthesia without irritations of any kind. The effect of a single application continued undiminished for half an hour; three light applications produced anæsthesia lasting for twenty-four hours; three or four drops of a solution containing ½ mgm. to each drop, caused corneal anæsthesia in dogs to such a degree that perforation with pins was made within fifteen minutes and caused no expression of pain.—Amer. Jour. Pharm., July 1888, 346; from Le Progr. Med., June 2, 1888.

Santonin—Active Solution in Castor Oil.—Dr. Bayon recommends the following method for obtaining a very active preparation of santonin which is clear, and which he has long administered with the best results.

Take of crystallized santonin 1 gm.; strong alcohol, 120 gm.; ol. ricini, 240 gm. Dissolve the santonin in the alcohol, mix with the oil, and remove 80 gm. of the alcohol by distillation.—Amer. Jour. Pharm., Oct. 1888, 511; from Monit. Thérap., Aug. 6, 1888.

Quillajic Acid—Preparation, Characters, etc.—According to R. Kobert, the saponin of commerce, as all other specimens of saponin, is an almost inactive, non-poisonous modification of quillajic acid. The author precipitated the acid from the aqueous extract of the bark of *Quillaja Saponaria* with neutral lead acetate; the precipitate was freed from lead, the solution of the acid evaporated almost to dryness, and then taken up with hot absolute alcohol. The coloring matter was precipitated with chloroform; the quillajic acid eventually crystallized out in pure white flakes. It is insoluble in ether, soluble in water and alcohol. On treatment with concentrated sulphuric acid, it becomes dark red. By boiling with dilute mineral acids, it is split up into an unfermentable glucose and sapogenin; this solution reduces Fehling's solution. Quillajic acid has the formula $C_{19}H_{30}O_{10}$. The sodium salt acts as a very severe caustic on the tongue and throat, and the smallest particles coming in contact with the nose or throat cause violent sneezing and coughing. Brought on to the eye, it causes severe pain, flow of tears, and swelling of the lids. Injected into the blood, sodium salt proves fatal, causing cramp and paralysis of the respiratory organs and brain. On the other hand, it may be imbibed into the stomach without injury to the extent of 500 times the quantity which proves fatal when injected into the blood.—Jour. Chem. Soc., 1889, 55; from Arch. Exp. Path. Pharm., xxiii., 233.

Strophanthin—Preparation by Arnaud.—The very active *strophanthin* (strophantin) of Arnaud is obtained by him as follows: The crushed seeds of *Strophantus Kombé* are treated with boiling alcohol of 70° for several hours, and the solution distilled to a small bulk on a water-bath; the distillation is finished in a vacuum, care being taken that the extract remains liquid. The residue is cooled, the supernatant oil and resin separated, the liquid filtered and heated with a small quantity of basic lead acetate and some finely powdered litharge. The liquid is again filtered, the lead removed by means of hydrogen sulphide, and the filtrate concentrated at 50° to a thick syrup, from which the strophantin slowly crystallizes. The crystals may be purified by recrystallization from boiling water; the yield is 4.5 grams per kilo.

Arnaud's strophantin is a white bitter substance, which crystallizes in micaceous plates, grouped round a nucleus. It readily retains water mechanically, and also forms a hydrate, which loses its water in a vacuum or in dry air. The hydrate melts below 100°, and the residual strophantin is uncrystallizable. If, however, strophantin is carefully dried in a vacuum, it may be heated at 110° without alteration. Anhydrous strophantin becomes pasty at 165°, and partially decomposes. It

acts on polarized light: the rotatory power of a 2.3 per cent. aqueous solution $[a]_D = +30°$. It is only slightly soluble in water, and somewhat soluble in alcohol, but is insoluble in ether, carbon bisulphide and benzene. It is precipitated from its aqueous solutions by tannin. Its composition corresponds to the formula $C_{31}H_{48}O_{12}$, and it seems to be an immediate higher homologue of *ouabaïn* (which see), which it resembles closely in properties.—Amer. Jour. Pharm., Feb. 1889, 85; from Compt. Rend., cvii, 179–182.

Strophanthin—Extreme Toxic Power.—Prof. Sée, in a communication to the Academy of Medicine (Nov. 13), said that the strophanthus plant or its extracts only, should be used in medicine; strophanthin, he said, had so high a toxicity that it "must not be employed clinically." At the same meeting Dr. Dujardin-Beaumetz also recommended that strophanthin be prescribed in no case, "as the quantity of strophanthidin contained in it must, for the present, be more or less conjectural." The samples of strophanthin having this powerful action seem to have been made by Arnaud, chief of Chevreul's laboratory.—Amer. Jour. Pharm., Jan. 1889, 18; from Un. Méd., Nov. 15, 1888.

Ouabaïn—A Toxic Principle from Ouabaïo, which see under "Materia Medica."

Ouabaïn—Production of an Identical Body from Strophanthus glaber, Gabon.—Some time ago, Arnaud had obtained from *Acokanthera Ouabaïa* a glucoside (see above), "Ouabaïn" ($C_{30}H_{46}O_{12}$), which corresponded very closely with the glucoside "Strophanthin" ($C_{31}H_{48}O_2$), from *Strophanthus Kombé,* both in its chemical character, and in its physiological characters, the similarity being explainable by the circumstance that the plants are closely allied members of the Apocynaceæ. Hardy and Galois have since obtained a crystalline body from *Strophanthus glaber,* which from the scarcity of material at command they were unable to identify completely. Arnaud has now subjected this body to further study. The finely powdered seeds, after being freed as far as possible from fixed oil by pressure between bibulous paper, were macerated for several days in alcohol of 70 per cent., with the addition of a little calcium carbonate, at a temperature not exceeding 60°. The alcoholic filtrate was evaporated in vacuo to syrupy consistence, this residue was dissolved in water at 50°, filtered, the filtrate evaporated to dryness in vacuo, and the faintly colored crystalline mass purified by several crystallizations from water. The yield was 4.7 per cent. of the weight of seeds used. The crystalline substance so obtained constituted small, transparent, six-sided plates; but if obtained by slow crystallization they are thicker and opaque. They melt at 185°, are soluble in 150 parts of water at 8° C., and the solution deflects polarized light to the left. They have the composition of the ouabaïn from *Acokanthera Ouabaïo* ($C_{30}H_{46}O_{12}.H_2O$), as well as the proper-

ties of this substance completely.—Arch. d. Pharm., May 1889, 469–370; from Jour. de Pharm. et de Chim., 1889, xix, 245.

Andromedotoxin.—Occurrence and absence in plants belonging to the *Ericaceæ*, which see under "Materia Medica."

Oleandrine and Nereine—Uncertainty as to their Existence.—Dr. Bardet expresses surprise that Prof. Sée should consider as settled the question of the similarity of oleandrine to digitaleïn and of nereine to digitalin. He has sought in vain for these substances in the market, has, with Mr. Adrian, tried to isolate them, and believes that practically they have no existence, regarding them, like many of the alkaloids, as purely scientific products, found once, and sometimes sought for afterwards in vain. Druggists will perhaps dispense a substance obtained by an indicated process for oleandrine, but it will be no more than an unknown residuum. —Amer. Jour. Phar., 1889, 174; Nouv. Rem., Feb. 8.

Methysticin—Preparation and Characters.—Robert Glenk observes that on evaporating an alcoholic tincture of the root of *Piper Methysticum* to a small bulk, a crystalline precipitate forms, which is obtained snow-white on dissolving in boiling water (to separate resin) and allowing to cool. This principle is the methysticin first observed by Morton, in 1844, and further examined, in 1860, by Cuzent, Gobley and O'Rorke. Crystallized from alcohol, it forms fine needles, which are odorless and tasteless, and freely soluble in ether, benzol and benzin; very soluble in boiling alcohol, slightly soluble in the cold, soluble in about 60 parts of boiling water, but sparingly soluble in the cold; separating as a crystalline feathery precipitate. Its solution in hot water is of a neutral reaction, and is not precipitated by alkaloidal reagents. When placed in a test tube kept in mercury, the principle melts at 133°C.; by heating on platinum foil it burns with a smoky flame, and is finally consumed without residue. It does not reduce an alkaline solution of copper. Concentrated sulphuric acid forms immediately an intense carmine color, which changes to a brown in one or two hours. Concentrated nitric acid dissolves it with a reddish-brown color. Concentrated hydrochloric acid gives an orange red color. With oxidizing agents, like permanganate of potassium, chromic acid ($K_2Cr_2O_7+H_2SO_4$), or nitric acid, it is decomposed, with the production of a strong heliotropin-like odor, which is quite characteristic, being produced even in very dilute solutions. A cold solution of methysticin in diluted alcohol, on being boiled for a few seconds with dilute nitric acid, gives a decided odor of heliotrope. This does not occur with other oxidizing agents in such dilute solutions. The color, with concentrated sulphuric acid, is also quite characteristic, a bright carmine red being produced, in rather dilute solutions, on adding to four or five drops of the latter about ten drops of the acid.—Amer. Jour. Pharm., Jan. 1889, 8–9.

Methysticin—Characters, etc.—C. Pomeranz has recently subjected "methysticin" or "kawahin," originally isolated by Cuzent (1860) from the root of *Macropiper Methysticum*, to comprehensive investigation. The substance is readily obtained pure by extracting the powdered root with alcohol, concentrating the tincture, and several times recrystallizing the crystals that separate on standing. Methysticin constitutes white, silky-glistening needles, which melt at 131°C. It is not volatile, readily dissolved by hot alcohol, by chloroform and by benzol; less readily dissolved by cold alcohol and by ether. Hot water and petroleum ether only dissolve small quantities. When melted with caustic potassa and a little water, it is decomposed with the production of pyrocatechuic acid mainly, together with carbonic and acetic acid. By heating methysticin with thirty times its weight of a 10 per cent. solution of potassa in a flask with a reverse condenser for several hours, it furnishes a yellowish crystalline body which, when purified by the aid of alcohol and animal charcoal, forms delicate, silky-glistening crystals, melting at 180°. These yield on oxidation piperonylic acid. The author regards methysticin to be a derivative of the methylen ether of pyrocatechin.—Arch. d. Pharm., Oct. 1888, 898–899; from Pharm. Post., 21, 485.

Cephalanthin—A New Glucoside.—Edo Claassen has isolated from the bark of *Cephalanthus occidentalis* (button bush, swamp dogwood). by a process which he gives in some detail, a new glucoside, which he has named *cephalanthin*. It is a white, amorphous, pulverulent substance, tasteless at first, but gradually developing a bitter taste, its solutions in alcohol or in watery solutions of ammonia, lime or magnesia, being quite bitter. It is sparingly soluble in cold or hot water, but very readily in alcohol, readily soluble in ether, with difficulty in chloroform, and insoluble in benzol and petroleum ether. It is particularly readily soluble in solutions of alkalies, and also in water containing alkaline earths in suspension, even in the carbonates of the latter disengaging carbonic acid. It is therefore an acid, as is also shown by its reaction upon litmus, but is precipitated from its alkaline solutions by oxalic, tartaric, acetic, and the mineral acids, forming gelatinous precipitates resembling hydrate of aluminium. While cephalanthin, which may also be called *cephalanthic acid*, does not reduce alkaline copper solutions at the ordinary temperature, it does so slowly when heated with such, and particularly after having previously been boiled with dilute sulphuric acid. It must therefore be regarded a glucoside.—Pharm. Rundschr., June 1889, 131–132.—See also Proceedings, 1875, p. 176.

Hydrangin—Ultimate Composition.—In continuation of the experiments of C. S. Bondurant (see Proceedings 1887, 159), who isolated the glucoside "hydrangin" from *Hydrangea arborescens*, and gave the method for its preparation and a comprehensive description of the new substance, Hermann J. Schroeter has determined the ultimate compo-

sition of hydrangin. Making four combustions with calcic oxide, he obtained figures which lead him to the formula $(C_{34}H_{25}O_{11})X$.

Experiments on the physical and chemical properties of hydrangin compared well with those stated by Mr. Bondurant, with but few exceptions. Its melting point was found to be 228° C., instead of 235° C., and the solidifying point at 217° C. Mention was also made that hydrangin dissolves in concentrated sulphuric acid without color. On dissolving a portion in concentrated H_2SO_4, a distinct violet-red fluorescence was observed, although not quite as strong as that produced by an alkali, which is intense opal blue. On addition of 5 volumes of water to the solution in H_2SO_4, the fluorescence was destroyed; the addition of ammonia to the same solution destroyed the color also, but on neutralizing the solution, the characteristic opal blue fluorescence reappeared. The substance was also found to be soluble in 80 per cent. acetic acid with slight fluorescence, which became more decided on dilution with 5 to 10 volumes of water.

The decomposition product of hydrangin, obtained by boiling with a dilute acid, was found to be soluble in chloroform, which deposited it as a brownish resin-like body.—Amer. Jour. Pharm , March 1889, 117–118.

Cubebin—Chemical Constitution.—C. Pomeranz, in continuation of his studies on the chemical constitution of cubebin (see Proceedings 1888, 581), has determined it to be an alcohol. By treating cubebin with benzoyl chloride he obtained the benzoic-ether of cubebin—$C_7H_5.C_{10}H_9O_2.O_2$. This forms fine, white, silky-glistening crystals. In an experiment to acetylize cubebin by the method of Liebermann, the author obtained cubebin-ether which is produced according to the following equation:

$$2C_{10}H_{10}O_3-H_2O=C_{20}H_{18}O_5.$$

It melts at 78°.—Arch. d. Pharm., Aug. 1888, 746–747; from Monatsh. f. Chem., 9, 323.

Vanillin—Detection of Benzoic Acid.—Vanillin has been adulterated with benzoic acid. According to Gehe (Handelsbericht) the adulteration is readily detected under the microscope, vanillin crystallizing in needles, while benzoic acid crystallizes in plates. The benzoic acid is readily extracted by treating the suspected article with dilute solution of sodium carbonate. The filtrate after neutralization gives a brown precipitate of ferric benzoate on addition of ferric chloride. Excess of hydrochloric acid precipitates the benzoic acid in substance. Either precipitate will yield benzaldehyd, recognized by its bitter almond odor, by subjecting it to the reducing action of magnesium foil and dilute sulphuric acid.—Arch. d. Pharm., Dec. 1888, 1088.

Diosmin—Isolation, Characters, and Possible Identity with Hesperidin.—In a former examination of the leaves of *Diosma crenulata* and *D. betulina* (see Proceedings 1886, 542–543), P. Spica had found that after the

essential oil had been removed, alcohol extracted from the leaves a crystalline substance, which he called *diosmin*. The amount present in the leaves varies very much, not only with the season when they are gathered, but also with the age of the plant; at no time, however, is it large. The best way of extracting it is first to treat the leaves with light petroleum to remove the essential oil and waxy resinous matters, then with cold alcohol of 85 per cent., which removes the chlorophyll and acid extractive substances, and finally to treat it with boiling alcohol of 80 to 85 per cent., which is the best solvent for the diosmin. It is very troublesome to purify. But this may be effected by treating the residue left on evaporation of the alcoholic solution successively with a solution of ammonium carbonate, cold alcohol, and ether, and then recrystallizing repeatedly from alcohol of 80–85 per cent. When pure, diosmin is a white, crystalline powder, consisting of very slender microscopic needles, odorless, tasteless, and insoluble in most solvents. Its best solvent is boiling alcohol of 80–85 per cent. It melts at 243–244°, with decomposition and evolution of gas. If cautiously melted on platinum foil, it emits a pleasant odor resembling that of orange peel when it begins to burn; subsequently the odor is like that of caramel. Diosmin does not reduce Fehling's solution. It dissolves in concentrated sulphuric acid and in solutions of the alkalies with yellow coloration, but at the same time undergoes alteration. By boiling diosmin with dilute hydrochloric acid, it splits into a yellow crystalline compound, and a substance capable of reducing Fehling's solution. By the ultimate analysis of diosmin, figures are obtained which closely agree with the numbers obtained by Paternò and Briosi for hesperidin, namely 53.44 and 5.92; but E. Hoffman, taking the formula as $C_{22}H_{28}O_{16}$($C=54.77$ and $H=5.39$), considers that the sample analyzed by Paternò and Briosi was incompletely dried, and that a temperature of 150° is necessary to remove all the water.—Jour. Chem. Soc., 1888, 1310; from Gaz. Chim. Ital., xviii, 1–9.

Acorin—Constitution, etc.—In a former paper (see Proceedings 1886, 376) H. Thoms had reported that acorin as obtained by him from calamus root is not, as reported by Faust, a nitrogenous alkaloidal body, but that it is a non-nitrogenous, perfectly neutral body, which when heated with dilute acid, is split into volatile oil and a body reducing Fehling's solution. This statement has since been contradicted by Genther, who maintains that the bitter principle of calamus is a nitrogenous body, having a strong acid reaction, and that no sugar is found in the products of the splitting up of the substance by acids. Genther's observations being diametrically opposed to those of Thoms, the latter has again gone over the entire ground. His present results completely confirm those at first obtained, the only doubt being as to the character of the product that has the power of reducing Fehling's solution, its identity with sugar not being determinable by solution of phenylhydrazin.

It is evident also from the process pursued by Genther, that the principle obtained by him as acorin was partially changed during the process of its extraction, since it is subjected to the action of water vapor for 10 hours, instead of being at once separated by shaking out with ether. Acorin as now obtained by Thoms is a golden, transparent, bitter substance, having an aromatic odor, neutral reaction, and contains no nitrogen. By boiling with dilute acids, it is split into a volatile, acid resin, and a body having the power to reduce Fehling's solution.—Arch. d. Pharm., Aug. 1888, 701–702; from Pharm. Centralh., 1888, 290.

Rhinanthin—Occurrence in Antirrhinum majus.—Dr. T. L. Phipson had some time ago noted the discovery in the leaves of snap-dragon (*Antirrhinum majus*) of a glucoside similar to digitalin. Recent experiments prove it to be identical with *rhinanthin*, the glucoside which H. Ludwig some twenty years ago extracted from the seeds of *Rhinanthus hirsutus* and *R. Crista-galli*, Reichenb. Dr. Phipson finds that rinanthin exists rather plentifully in the leaves and stalks of *Antirrhinum majus*, and that it shows a reaction by which it can be recognized, even when present in very minute quantity in an aqueous solution. According to the author's experiments it can be extracted from the plant either by means of methylic alcohol or by cold water. The former process gives the larger yield, but the latter gives a purer product, and is in every respect easier and more economical. The plant, when fresh, is very brittle, and can be easily broken up or cut into small fragments, which, with the leaves and stalks, are allowed to remain in water in a closed vessel for a few days. The liquid is then filtered, treated with a small quantity of sub-acetate of lead (which does not precipitate rhinanthin), filtered again, and the slight excess of lead having been separated from the filtrate, the latter is evaporated carefully (on a water-bath) almost to syrupy consistence, and then the vessel is allowed to remain in a warm dry place for a few days. In these circumstances rhinanthin forms transparent colorless rhombic crystals, which are very brilliant; it can be purified by a second crystallization from water. It has a peculiar sweetish acrid taste, and is very soluble in water and in alcohol. The aqueous solution of rhinanthin, to which a few drops of hydrochloric acid are added, and then heated, gradually turns brown, finally deposits an amorphous dark-brown precipitate (*rhinothogen*), and the supernatant solution contains glucose. This reaction is very sensitive, and precisely similar in appearance to the brown tint developed in solutions of glucose heated with soda (for instance, diabetic urine), only in the present case the color is produced by acid. A perfectly clear colorless solution of rhinanthin in water, placed in a test-tube with a few drops of HCl and heated, turns gradually brown, and in a few moments, just after the solution has reached its boiling point, it is quite dark and opaque. A copious precipitate of *rhinanthogen* results in the form of a dark reddish-brown

amorphous powder, which can be filtered off and washed. The filtrate contains glucose. This rhinanthogen dissolves in hot concentrated sulphuric acid, forming a greenish black solution. It is also attacked easily by nitric acid.—Chem. News, Aug. 31, 1888, 99.

Catalpin — A Bitter Glucoside from Catalpa bignonioides.—Edo Claassen describes the method pursued by him for isolating the bitter constituent of the fruit and bark of the catalpa tree, which he finds to be a glucoside, and which he has named "catalpin." As obtained it constitutes warty-stellate aggregations of colorless, needle-shaped crystals, or very delicate thread-like crystals, united in form of concentrically-arranged bundles. The glucoside melts on heating, forming a colorless fluid, which on cooling congeals to a glassy, fissured mass, which, on application of higher heat, puffs up, and finally burns without residue. It is readily soluble in cold water, very readily in hot water, and the same is the case in cold and hot alcohol, but in ether it is very sparingly soluble, while it is insoluble in benzol, nearly insoluble in chloroform, and soluble in amyl alcohol.—Pharm. Rundschau, July 1888, 155–157.

Picrotoxin—Value as an Antidote for Morphine.—According to Bokai, picrotoxin is the most rational antidote for morphine, it having been experimentally demonstrated to possess properties directly antagonistic to those of morphine.—Apoth. Ztg., 1889, 139.

Capsaicin—Preparation and Yield.—According to A. Meyer, capsaicin is present exclusively in the placenta of *Capsicum annum*, the other portions of the fruit being entirely free from it. The placenta of 5000 gm. red pepper weighed 110 gm. which contained 0.9 per cent. capsaicin, or for the whole fruit 0.02 per cent. The isolation was effected by extracting with boiling ether, evaporating, mixing with oil of sweet almonds (to retain the red coloring matter), extracting with 70 per cent. alcohol, evaporating, dissolving in solution of potassium hydrate free from carbonate, filtering, and passing into the filtrate CO_2 to saturation; after standing some days the capsaicin crystallizes out and is purified by washing with water and cold benzin.—Pharm. Ztg., 1889, 130.

Frangulin and Emodin.—Occurrence in *Rhamnus Frangula*, etc., which see under "Materia Medica."

Coronillin.—A bitter principle from *Coronilla scorpioides*, which see under "Materia Medica."

Phytosterin.—Occurrence in the precipitate from *Fluid Extract of Hydrastis* and *Fluid Extract of Berberis aquifolium*, which see under "Pharmacy."

COLORING MATTERS.

Blue Coloring Matter of Flowers—A Neglected Study.—Prof. J. M. Maisch, referring to the experiments of Wm. G. Greenawalt upon the blue coloring matter of the blue flag flowers, (see *Iris Test Paper*, under

"Pharmacy"), observes that the principles to which flowers owe their characteristic colors do not appear to have been the subject of recent researches, and the results obtained by older investigations have been more or less forgotten, and are not referred to in many chemical text-books in which some information on such an interesting subject would naturally be sought for; even Fownes' manual is entirely silent on the coloring matter of flowers, carmin and carthamin excepted, though a number of other vegetable coloring matters have been described. The cause for this disregard is evidently to be looked for in the unsatisfactory results thus far obtained, and these are very easily explained by the difficulties surrounding an investigation of substances which are apparently not crystallizable, and are known to be very readily altered under the influence of various physical and chemical agencies. The principal investigations, embracing blue flowers of different orders, were published by Marquardt in 1835, and by Frémy and Cloëz in 1854, in addition to which a large number of observations on the coloring matter of certain flowers might be mentioned. Marquardt named the blue coloring matter *anthocyan*, the *cyanin* of Frémy and Cloëz, the latter name having been more recently appropriated for a blue dye-stuff derived from chinoline. The chemists named regard the coloring principles of all blue flowers as identical, the blue compound being amorphous, soluble in water and alcohol, but insoluble in absolute alcohol, ether, volatile oils, etc. Its solution is sometimes rapidly decolorized on exposure, also by reducing agents; it is colored red by acids, and green by alkalies, and yields with lead acetate a green precipitate. The coloring matter of red flowers is regarded as antho-cyan (cyanin) colored red by acids. Even white flowers often contain the same coloring matter, and hence are colored green by alkalies. The coloring matter of various berries is changed to green by alkalies, and to red by acids, and has been regarded as identical with that of blue flowers, but derivatives of quercitrin and rutin are likewise known, having similar reactions. The identity of the blue coloring matters of different flowers has as yet not been proven, and it is not improbable that a number of different compounds may ultimately be isolated, having similar yet not identical properties; in other words, that the coloring matters of flowers differ to a greater extent than the earlier investigations seemed to indicate.—Amer. Jour. Pharm., Dec. 1888, 599–602.

Nitro-alginic Acid—A New Dye from Sea-weed.—F. Nettlegood, while experimenting on the production of gelatinous gun cotton, decided to nitrate alginic acid. This formed a low nitrated body, which was not analyzed; it was sufficiently elastic on compression, but not explosive. In alkaline solution, it gave a brown color. The original color of the nitro-alginic acid was bright yellow, and the principle was insoluble in water. Unmordanted cotton dyed a fine Bismarck brown color, which was fast to

soap more than many aniline colors, equalling chrysoidine. Mordanting with alumina or tartar emetic did not increase the fastness or the depth of the color. The depth of shade was considerable, and could be worked to a great intensity. In an acid solution the dye failed to attach itself to the fibre, ammonia being the best alkali. For wool, the brown dye appeared to have little power of attraction. Mordanting did not increase the depth of the dye.—Chem. News, July 13, 1888, 15.

ALBUMINOIDS.

Albumen—New Method for its Estimation in Urine.—A. Christensen recommends the following method for the estimation of albumen in urine, which is considered more accurate than Esbach's. It consists in the use of tannic acid as the precipitant, and the suspension of the precipitate in the urine by means of mucilage. This mixture is then, after being diluted with water, poured into a vessel of certain capacity, which is placed over a white surface on which black lines are drawn. The amount of the "emulsified" urine necessary to obscure the lines will be in the inverse ratio to the quantity of albumen in the urine—a quantity easily estimated by the employment of a suitably graduated burette. The principle is the same as that introduced by Panum for the determination of the quantity of cream in milk, and can no doubt be made available for clincal work. The results obtained are given in tables, but so far as can be gathered from these, the advantage of the plan over that of Esbach (a far simpler method) does not seem very great; neither plan is quite accurate.—Amer. Drugg., June 1889, 111; from Jour. Chem. Soc.

Albumen—Determination in Urine.—Dr. H. Schauman proposes a modification of the gravimetric method for the determination of albumen in urine. Instead of the ordinary paper filter he uses a plug of cotton-wool freed from fatty matter, and pressed firmly into a glass tube drawn out to a narrow point. For this purpose a filter-tube is adapted, as introduced by Allihn for the determination of sugar. This tube, with its cotton plug, is dried at 110° and weighed. It is then fixed firmly, by means of a cork, in a filter-support, which is then, in turn, connected with a filter-pump. The albumen in a weighed quantity of urine is precipitated in a beaker by the addition of a small quantity of acetic acid, and heating for half an hour on the water-bath. The clear supernatant liquid is first poured into the tube. The coagulum which adheres rather firmly to the bottom of the beaker is repeatedly washed with hot water, and the washings carefully poured upon the cotton before the precipitated albumen is introduced. This is then washed with hot water with the aid of the filter-pump, until the liquid running out no longer gives a chlorine reaction with silver nitrate. The tube is then closed at the wider end with a cork, perforated to admit a glass tube. It is then placed in a small rectangular drying-box of sheet iron, provided on each of its

opposite sides with a circular aperture, into which the filter tube is inserted. The end having the perforated cork is connected with a calcium chloride tube and a washing-bottle charged with sulphuric acid, whilst the drawn-out end is connected with an aspirator. For an hour a moderately rapid stream of dried air is drawn through the filter-tube. The temperature in the drying-box is gradually raised to 100°, and, after heating to this point for an hour, it is raised further to 110°, dried air being still drawn through in a moderately strong current. After heating for two hours at 110°, the tube is weighed and re-weighed every half hour, until the weight is constant.—Chem. News, Nov. 16, 1888, 245; from Zeitschrift für Analytische Chemie, Vol. xxvii, Part 5.

Albumin—Densimetric Estimation in Urine.—H. Táhor recommends the following densimetric method for the estimation of albumen in urine as being both simple and reliable: The filtered urine is mixed with just so much dilute acetic acid that, when it is boiled, all the albumin is coagulated; the right proportion may be ascertained with a small quantity of the urine in a test-tube beforehand. On being filtered from the coagulum, the filtrate should give no cloudiness with acetic acid and potassium ferrocyanide. A quantity of the urine is then placed in a flask, and the latter firmly closed with a clean caoutchouc stopper. The flask is hung for ten to fifteen minutes on a large bath, filled with water kept boiling. By this means the albumen is precipitated. It is then filtered off, the funnel leading through a cork with a hole in it into a flask, and being covered with a glass plate. The density of the urine and of the filtrate is then estimated, not with a pycnometer (that is unnecessary for clinical work), but with an hydrometer marked to four places of decimals. Both fluids must be kept at the same temperature. This is best done by placing them in two cylinders, both immersed in a large vessel of water, which should be kept at the same temperature if a series of observations are to be made. The temperature of 17.5° will be found most convenient. The difference between the two specific gravities is then multiplied by 400, and the product gives the number of grains of albumen in 100 c.c. of urine.

A large number of illustrative experiments are quoted in the original paper, in which the approximate accuracy of this simple process is demonstrated. The number 400 is the mean in round numbers of the factor $\frac{100\ V_2}{V(V_2 - V_1)}$. The question naturally arises why a constant factor should give such good results in albuminous urine, when not only theoretically, but also in practice, it yields fallacious results in other albuminous fluids, such as the blood, transudations, white of egg, etc. The reason is that the factor must be multiplied by the *difference* in the specific gravities. In proteid solutions (other than albuminous urine) this difference varies from 0.0016 to 0.0128, whilst in albuminous urine

this difference is much smaller, varying between 0.00012 and 0.0020; that is, in the former case, the difference is from six to thirteen times greater than in the latter, and therefore so many times greater will be the error introduced by the use of a constant factor. In the case of urine, this error may be neglected.—Amer. Drugg., Feb. 1889, 38; from Zeitschr. Phys. Chem.

Albumin, Peptones, etc.—Value of Tanret's Reagent.—Brasse draws attention to the value of Tanret's reagent—the double iodide of potassium and mercury—for determining the presence of albumin, peptones, and alkaloids in urine, which substances it precipitates without the use of heat. If the precipitate does not redissolve with heat, the substance is albuminous; if it dissolves, it is a peptone or an alkaloid. In the latter cases the cooled precipitate should be treated with ether, which dissolves an alkaloidal precipitate. It has been stated that this reagent gives insoluble combinations with certain normal elements of urine. The author finds that allantoïne, alloxane, creatinine, hypoxanthine, leucine, tyrosine, xanthine, etc., do not form such compounds. When the urine contains biliary salts, the precipitate does not redissolve with heat, thus leading to a supposition that albumin is present; agitation with ether, however, redissolves the precipitate if in reality the urine is free from albumin.—Amer. Jour. Pharm., Aug., 1888, 405; from Arch. de Phar., July 5, 1888.

Ferric Albuminate with Citrate of Sodium—A New Scale Preparation.—E. Dieterich suggests a ferric albuminate with citrate of sodium in scales, from which a solution can be made without the use of acids or alkalies. To prepare the salt, 40 liters distilled water are heated to the boiling point and allowed to cool to 50°; to 20 litres are added 1200 gm. solution of oxychloride of iron (dialyzed iron); in the other 20 liters 300 gm. coarsely powdered dried egg albumen are dissolved by stirring, the solution strained and added to the iron solution; 40 gm. solution of soda are diluted with 300 gm. distilled water, and with this the above mixture is very carefully neutralized (requires about 300 gm.). The precipitated ferric albuminate is washed by decantation with water which had been heated to 100° and cooled to 50° until the washings are free from chlorine, collected on a wet linen strainer and allowed to drain. 30 gm. citric acid are dissolved in 120 gm. distilled water and neutralized, applying heat, with crystallized sodium carbonate (60–65 gm.); after cooling, this solution is added to the precipitate, which has been removed to a porcelain capsule, and after solution results this is strained and evaporated at a temperature not exceeding 40°, best in a vacuum, to a syrupy consistence, *poured* upon glass plates, and, after drying, the scales removed. (If the syrupy liquid be *spread* upon the glass plates, the scales will become opaque, due to small air-bubbles which coat the surface and cannot escape.) The scales are lustrous, dark garnet in color, permanent

in air; soluble in half their weight of water to form an odorless, neutral solution with a slightly saline and only a faintly ferruginous taste. Contain 15 per cent. iron. A neutral solution containing 0.42 per cent. iron is made by dissolving 28 gm. of the scales in 770 gm. distilled water, adding 100 gm. alcohol, 100 gm. spirit of cognac, 1.5 gm. each of the tinctures of ginger, galangal and Ceylon cinnamon, filtering after standing for 24 hours, and washing the filter with sufficient water to make the filtrate weigh 1000 gm.

Mr. Dieterich also suggests scale preparations of ferric peptonate and of dialyzed iron. The *ferric peptonate with sodium citrate*, containing 15 per cent. of iron, is made by dissolving the ferric peptonate (See Liq. Ferri Peptonatum, page 745) in a cold solution made by neutralizing 3.5 gm. citric acid, dissolved in 12 gm. distilled water, with crystallized sodium carbonate (7 to 8 gm.); the solution is evaporated in a steam-bath to a syrupy consistence, and is spread upon glass plates. The scales are of a chocolate brown color, friable, odorless, easily soluble in water, the solution having a mildly saline, slightly ferruginous taste. To make the solution containing 0.42 per cent. iron, 28 gm. of the scales are dissolved by heating with 870 gm. distilled water, 100 spirit of cognac added, the solution filtered, and the filter washed with sufficient water to make the filtrate weigh 1000 gm.

Dialyzed Iron with Sodium Citrate.—30 gm. citric acid are dissolved in 120 gm. distilled water and neutralized, applying heat, with 60–65 gm. crystallized sodium carbonate; to this solution add 1000 gm. solution oxychloride of iron (dialyzed iron), containing 3½ per cent. of iron, evaporate in a steam-bath to a syrupy consistence and spread upon glass plates; after drying at a temperature of 40° the scales are preserved in well-stoppered vessels. The compound contains 31–33 per cent. of iron, and forms dark red-brown hygroscopic scales, easily soluble in water, yielding a neutral, mildly saline solution almost free from ferruginous taste.—Pharm. Centralhalle, 1889, 234.

Milk—Constitution.—Béchamp is convinced that in milk the fat globules are not suspended as in a mechanical emulsion, but held in separate cells possessing a distinct pellicle. This is clearly proved by separating the cells and isolating the teguments, which he exhibited on a paper filter. To effect this he removed the casein with sesquicarbonate of ammonia, and gathered the fat-cells on a filter, where they were thoroughly washed and dried. Next, with a gentle heat, the fatty matter was melted out, and the cell epidermoids remained on the filter. The pellicles could easily be freed from all fat and examined. That they do not consist of casein is proved by the fact that they are soluble in alkalies, even caustic potash. The professor also held that casein is not coagulated by heat when freed from its combination with milk albumen, and it is to the latter substance that coagulation is due when it does occur.—Amer. Drugg., Jan. 1889, 13; from Chem. and Drugg.

Milk—Standards of Different Localities and Assays of Samples.—Albert James Lynch states that the standard for pure milk, adopted in different localities, is as follows:

	France.	England.	N. York.	N. Jersey.	Mass.
Fat	2.70	2.50	3.0	3.0	3.65
Other solids	8.80	9.0	9.0	9.0	9.35
Total solids	11.50	11.50	12.0	12.0	13.00

During the winter of 1887–88, the author examined a number of samples of milk procured in the Philadelphia market, with the following results:

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Fat	5.21	3.63	2.61	2.70	3.51	2.65	5.04	3.75
Other solids	15.60	9.26	9.01	9.22	9.08	9.18	10.46	9.21
Total solids	20.81	12.89	11.62	11 92	12.59	11.88	15.50	12.96

No. I. was Alderney milk; the solids consisted of fat 5.21, sugar 4.20, casein and albumen 5.69, ash 0.71. No. VII. was also sold as Alderney milk.—Amer. Jour. Pharm., Jan. 1889, 10.

Cow's Milk—Substitute.—Dr. Ledentes recommends artificial cow's milk, which consists of white of egg, 16 gm.; almond oil, 35 gm.; sugar of milk, 40 gm.; sodium carbonate, 0.4 gm.; calcium phosphate, 0.5 gm.; and sodium chloride, 0.2 gm., and sufficient water for one liter of emulsion.—Amer. Jour. Pharm., Aug. 1889, 409; from Concours Méd., 1888.

Koumiss—Cause of its Retention by the Stomach.—T. R. Powell, in view of the fact that no suggestion has hitherto been offered which explains the retention of fermented milk or koumiss by the stomach when all other nourishment has been rejected, has made some experiments, which lead to the conclusion, that koumiss is retained by the stomach in preference to milk for the following reasons:

1. That coagulation has already taken place.

2. That the precipitated casein, the nourishing constituent, is in a very fine, almost gelatinous, condition.

3. That carbonic acid is present in the free state, and exerts a sedative action.

4. That free lactic acid still further stimulates and aids digestion.

His experiments and observations seem to prove that the indigestion and nausea, so often produced when a milk diet is desirable, are the result of the coagulation of the milk, a coagulation which may be delayed by the addition of alkalies.—Pharm. Jour. Trans., Aug. 25, 1888, 143-144.

Carbonated Milk—A Substitute for Kefir and Koumys.—Palm states

that carbonated milk, used in dyspepsia, lung troubles, etc., as a substitute for kefir and koumys, is made by charging in a soda water apparatus fresh milk with 2 or 2½ volumes of CO_2. To render it more palatable 1.5—1 gm. NaCl and 0.5 $NaHCO_3$ are added to each quart; these additions also prevent change for a time.—Amer. Jour. Pharm., Aug., 1888, 400; from Rundschau, 1888, 376.

Gastric Juice—Character of Acid Present.—According to Dr. Poulet's comprehensive researches the acid present in the stomach of man or the pig is "hippuric acid." In that of all carnivorous animals it is tartaric acid, which is also separable from the intestines. The author's method of obtaining the acid principle of the stomach and intestine consists in dialyzing either the contents of the stomach or intestine obtained from an animal in full gastric or intestinal digestion, or the scrapings of the gastric or intestinal mucous membrane. After dialyzing for twenty-four hours, the resulting liquid is evaporated at a gentle heat down to about thirty grams, and then treated in a wine-glass with sulphuric acid. The gastric juice of omnivorous adults, and notably of healthy men, contains, in the first stage of digestion, hippuric acid alone. Towards the end of the digestive act, a mixture of hippuric and tartaric acids is found. The latter is alone found in the secretion of the mucous membrane of the empty stomach. Before weaning, tartaric acid is the chief acid found. Since tartaric acid has been found to be the acid secreted by all carnivora, recourse must be had to the pig, which in its dental and digestive system corresponds with man, in future experiments.—Med. Chronicle, Dec., 1888; from Arch. de Physiol. Norm. et Pathol., Oct. 1, 1888.

Vegetable Pepsins—Distribution in Plants.—Dr. Frederick Hoffmann reviews the distribution of vegetable pepsins, of which the ferment in *Carica Papaya* is the type. Vegetable pepsins have so far been found in a number of plants belonging to different natural orders, such as the *Cucurbitaceæ*, *Droseraceæ*, *Ranunculaceæ*, *Solanaceæ*, *Galiaceæ*, and *Compositæ*, but the individual plants have been identified only in a limited number of instances. To this list additions are continually being made, particularly in the descriptions of travel in the western and interior countries of Africa, where the natives appear to be familiar with the fermentive action incited by the fruits and seeds of many plants.—Pharm. Rundschau, Sept. 1888, 206–208.

Vegetable Rennet—Use in the Kalahari Desert.—G. A. Farini, while on a journey through the Kalahari Desert, had his attention drawn to a small berry, the size of a red currant, the expressed juice of which—two were sufficient—curdled newly drawn milk within half a minute, leaving it sweet and pleasant to the taste. It grew on a prickly bush, not unlike a rose bush, but the plant has not been identified. It seems likely that this kefir substitute for rennet may find useful application in Europe and this country.—Amer. Drugg., Aug. 1888, 146.

Papayotin—Usefulness in the Treatment of Fissures of the Tongue.—Dr. Schwimmer has used papayotin successfully in cases of fissures of the tongue which had resisted the action of chromic acid, iodoform, and nitrate of silver. He employed the following formula: Papayotin, 1 to 2 parts; glycerin and distilled water, of each 10 parts. Five or six applications should be made daily, after drying the fissures.—Amer. Jour. Pharm., Jan. 1889, 16.

Chymosin — Preparation from Rennet.—Dr. L. H. Friedburg, in a paper on the active principle of rennet—the so-called "chymosin"—refers to pepsin, and shows that the latter when freed from chymosin will not coagulate milk, but will retain its full digestive power. Both substances are obtainable from the stomach of ruminants generally, chymosin preponderating in the stomach of the calf, while pepsin preponderates in the stomach of the sheep and also in the stomach of the pig. The treatment for obtaining these principles separately and in a pure condition is the same in all cases, that for the treatment of calf's stomach being described as follows: The stomach of the calf is cut into small pieces, and macerated or digested for about twenty-four hours in a solution, preferably of common cooking-salt, containing about 0.5 per cent. of salt, kept at a temperature of 30° C., more or less. The solution is then filtered, and a small amount of mineral acid—such as hydrochloric, sulphuric, or phosphoric acid—is mixed therewith, in the proportion of about 0.1 per cent. The reaction of the acid on the saline solution gives rise to a thick precipitate of mucous matter, which contains but traces of chymosin and no pepsin, the solution during the acidulation being preferably kept at a temperature of about 20° to 30° C., as at that temperature the mucous matter agglomerates more rapidly or readily, and may, in this condition, be easily separated from the solution, which is effected only with the greatest difficulty otherwise. The filtered solution is again acidulated, to the extent of about 0.5 per cent. of acid, and pulverized cooking-salt is added until a precipitate of the latter is formed. This supersaturated, acidulated salt solution is now brought to a temperature of 25° to 30° C., and kept at this temperature for two or three days under constant agitation, and then allowed to rest for a day or so, the temperature being increased to 30° to 35° C. A separation then takes place in the form of a white, flocculent substance, which floats on or in the solution, and may be readily collected on a filter, and then dried at a temperature of about 28° C. The substance separated from the solution is the pure zymotic product called

Chymosin.—It is an amorphous, white, gelatinous substance, greatly resembling aluminium hydrate, is without taste or smell, and soluble in water, forming a limpid or clear solution. It may be kept for years without deterioration, and is not injured by temperatures reaching as high as 35° C. The remaining saline, supersaturated, acid liquor or mother

liquor, free from chymosin, does not cause milk to curdle when mixed therewith; the active agent, chymosin, which alone produces this reaction in milk, having been eliminated from the mother liquor.

Pure Pepsin may now be obtained by neutralizing the liquor with an alkali, and agitating the same for some time, the pepsin being obtained as a gelatinous precipitate, insoluble in the concentrated neutral salt solution, but soluble in the acid salt solution. "Pure pepsin may be obtained from the so-called 'impure pepsin essence' or 'extracts of rennet of commerce,' by acidulating these extracts or the solution of the dry rennet with one of the mineral acids above referred to, in the proportion of about 0.2 per cent. of the acid, whereby the impurities are precipitated. These are removed by filtration, an excess of cooking-salt added, as described, to separate the chymosin, which is collected, and the remaining solution is neutralized to precipitate therefrom the pepsin. In this case, also, chymosin and pepsin are separately obtained, free from any albuminous, mucous, or other impure matter."—Amer. Drugg., Feb. 1889, 26; from Jour. Amer. Chem. Soc., x, 98.

Pepsin—Value of Different Tests.—James H. Stebbins, Jr., discusses the relative value of the "U. S. P.," the "Manwaring," and the "Kremel" test for estimating the digestive power of pepsin. The essential difference between the "U. S. P.," and "Manwaring's" test consists in the dilution of the so-called *pure* pepsins with sugar of milk so as to correspond to saccharated pepsin. The author enumerates his objections to both tests, and finds "Kremel's" test to be most reliable of any that have come to his notice. This test is made as follows:

One gm. of egg albumen (soluble) dried at 40° C., and pulverized, and 0.1 gm. of the pepsin to be tested, are placed into a 100 c.c. flask, and dissolved in 50 c.c. of 0.2 per cent. hydrochloric acid. The solution is heated to 38–40° C. for three hours, and then exactly neutralized with sodium carbonate; it is then heated on a water bath to 90° C., and cooled after coagulation has taken place. The flask is then filled to the mark with distilled water, and 50 c.c. are filtered off and evaporated to dryness in a platinum dish on a water bath.

The residue is dissolved in hot distilled water, filtered through a moist filter into a platinum dish, and the filter carefully washed. The solution is again evaporated to dryness and weighed. The peptone is then incinerated with ammonium carbonate, and the weight of the ash deducted leaves the weight of the pure peptone, or the representative of the digestive power of the pepsin.

The good qualities of the above test are the following:

1. Simplicity.

2. No guesswork, troublesome calculations or the use of questionable factors.

3. No weighing of albumen dissolved in hydrochloric acid, undigested

albumen and intermediary products along with the peptone. This is all obviated by the use of soluble egg albumen, coagulation and filtration, or removal of the undigested portion as detailed above.

4. The ease with which it is possible to duplicate and still obtain concordant results.

The objections to this process are trifling as compared to the objections to the above-mentioned processes.—Amer. Jour. Pharm., Sept. 1888, 466–474; from Jour. Amer. Chem. Soc.

Pepsin—Method of Estimating Peptonizing Power.—A. Percy Smith discusses the various methods of estimating the peptonizing power of pepsin, all of which he finds faulty in one respect or another. After various trials he discarded the use of fresh egg albumen altogether, and had recourse to dry powdered albumen, prepared by drying in a steam oven and levigation in a mortar. With this he succeeded in getting accurate comparisons between the digestive powers of various pepsins. Albumen in this form dissolves with rapidity, owing to its state of fine division. Any remaining undissolved can be filtered off on a counterpoised filter paper, and heated in a water oven until absolutely dry. It is, however, unnecessary to do this when two samples only are compared against each other, nor is it essential to know the actual weight of albumen employed, provided it be the same in each experiment. This is ensured by placing some on the naked pan of the balance (there is no objection to so doing, as it is a dry, gritty powder, and does not adhere to the metal), and counterpoising by a similar addition to the other pan. Let the albumen fall on the centre of the filtered liquid, avoiding, if possible, contact with the glass of the beaker. It soon sinks, and after the lapse of some time, a simple inspection will show which is dissolving with the greater rapidity. Agitation assists solution, therefore take the two beakers, one in each hand, and rotate the contents equally. When one sample has dissolved all the albumen it is manifestly superior to the other, which has failed to do so in the given time. If many samples have to be compared, it will be necessary to start with known quantities of albumen, and weigh the undissolved residues in the manner above indicated.—The Analyst, Aug. 1888.

Peptone—Composition, Character, etc.—According to Palm, peptone is a solution of albumen in acids. The action of lactic acid upon various albumens is to form peptone. This is also produced by the action of the same acid upon glue, chondrin and fibrin. By adding ether to an alcoholic peptone solution, a peptone of constant composition is separated as an oily mass, which contains the lactic acid and protein in stoechiometrical proportions. Albumen may be reprecipitated from peptone solutions by neutralizing the acid and adding 95 per cent. alcohol; alcohol acidulated with sulphuric acid will likewise precipitate the albumen, if too much acid be not present. The non-coagulation of the peptone is

due to the solubility of coagulated albumen in lactic acid; but on first neutralizing with ammonia boiling will coagulate peptone solutions. The explanation of the same composition of albumen and peptone is found in the fact that in the so-called purification of the peptone the albumen was always re-obtained. Peptone will reduce Fehling's solution, which is of importance in milk analysis. A distinctive test is the addition of potassium xanthogenate; with albumen solutions, a precipitate is only obtained on addition of acid, while peptone solutions, being acid, give a precipitate at once.—Pharm. Centrlh., 1888, 395; from Zeitsch. Anal. Chem.

Ferrum Peptonatum—Preparation.—According to E. Dieterich, ferrum peptonatum is prepared as follows: 75.0 fresh egg-albumen (10.0 dried) are dissolved in 1000.0 distilled water; to this is added 18.0 hydrochloric acid and 0.5 pepsin, and digested at 40° until a portion produces only a faint turbidity with nitric acid; allow to cool, neutralize with soda solution, strain and mix the liquid with 120.0 solution of oxychloride of iron and 1000.0 distilled water. The fluid is now *exactly* neutralized with diluted soda solution, and the precipitate washed by decantation with distilled water until the washings produce no turbidity with silver nitrate. The precipitate is collected on a wet linen strainer, drained, placed in a porcelain capsule, 1.5 hydrochloric acid added and heated, with stirring, on a water-bath until a clear solution results, which is concentrated, spread upon glass plates and dried at 20° to 30°, to yield a scale preparation, or from which is made

Liquor Ferri Peptonati by diluting with distilled water to 900.0 and adding 100.0 spirit of cognac.

The so-called "Indifferent Iron-preparations," to which class the above belongs, are very sensitive towards carbonic acid and sodium chloride, and in their manufacture it is essential to work as rapidly as possible, and to use distilled water, which has been heated, to expel CO_2, and again allowed to cool.—Pharm. Centrlh., 1888, 316.

Isinglass and Gelatin—Comparative Examination of Commercial Specimens.—Robert Baird examined commercial samples of isinglass and gelatin. Nos. 1, 2, and 3 were Russian isinglass; Nos. 4 and 5, American isinglass; No. 6 French gelatin, gold label; No. 7, French gelatin, bronze label; No. 8, Cooper's gelatin.

No.	1	2	3	4	5	6	7	8
Ash	0.4	0.643	0.527	2.407	2.17	1.14	2.66	4.775
Moisture	12.1	12.8	12.5	13.0	12.3	12.8	13.4	13.0
Insoluble in hot water.	6.0	5.2	5.5	10.0	18.5	Completely	soluble.	
Jelly with 24 parts of hot water	None.	Slightly opalescent.	None.	Opalescent.	None.	Transparent.		
Parts of water for jelly	18	24	21	24	19	24	24	24

—Amer. Jour. Pharm., Dec. 1888, 607–608.

APPENDIX.

LIST OF LIFE MEMBERS

(Names of life members under old constitution in *Italics*, under present by-laws in SMALL CAPITALS.)

Ash, Matthew F.
Baxley, J. Brown.
Berrian, George W.
BIROTH, HENRY.
Blatchford, Eben.
Bullock, Charles.
Burnett, Joseph.
CANNING, HENRY.
Chamberlain, Guilford T.
Colcord, Samuel M.
Cummings, Henry T.
CUTLER, EDWARD WALDO.
Dearborn, George L.
Doliber, Thomas.
DRURY, LINUS D.
Du Puy, Eugene.
EBERT, ALBERT E.
Ellis, Evan T.
FULLER, OLIVER W.
Gale, Edwin O.
Gale, William H.
Gallagher, Charles K.
Goodwin, Wm. W.
Gordon, Wm. J. M.
Grahame, Israel J.
Hale, Frederick.
Haviland, Henry.
Hay, Henry H.
HEINITSH, CHARLES A.
Heintzelman, Joseph A.
Heyl, James B.
HOLZHAUER, CHARLES.
Hudnut, Alexander.
JACQUES, GEORGE W.
Jenks, Wm. J.
JONES, EDWARD C.
JUDGE, JOHN F.
Kent, Robert R.
Kidder, Samuel.
KING, JAMES T.
KLUSSMANN, HERMANN.
Leitch, Arthur.
LEMBERGER, JOSEPH L.
MAISCH, JOHN M.
McConville, Thomas A.
McPherson, George.
Mellor, Alfred.
Melvin, James S.
Metcalf, Theodore.
MILBURN, JOHN A.
MILHAU, EDWARD L.
Moffit, Thomas S.
Moith, Augustus T.
Molwitz, Ernest.
Newman, George A.
Niebrugge, John A.
Ollif, James H.
Paine, James D.
Parr, John C.
Patten, I. Bartlett.
Peabody, William H.
Perkins, Elisha H.
Perot, T. Morris.
PFINGST, FERDINAND J.
Rano, Charles O.
REMINGTON, JOSEPH P.
Rittenhouse, Henry N.
Rollins, John F.
Russell, Eugene J.
SANDER, ENNO.
Saunders, Richard B.
SEABURY, GEORGE J.

Sharp, Alpheus P.
SHEPPARD, SAMUEL A. D.
Snyder, Ambrose C.
Steele, Henry.
Sweeny, Robert O.
Taylor, Alfred B.
Thompson, William B.
TUFTS, CHARLES A.
Turner, T. Larkin.
Vernor, James.
Wardell, Robert C.
Warner, Wm. R.
Wheeler, Lucien F.
WHITE, AARON S.
WHITFIELD, THOMAS.
Wiegand, Thos. S.
WINKLEMANN, JOHN H.
WOLTERSDORF, LOUIS.
Woodbridge, George W.
ZEILIN, JOHN H.

ALPHABETICAL LIST OF THE NAMES OF MEMBERS FROM WHOM MONEY HAS BEEN RECEIVED FOR ANNUAL DUES OR CERTIFICATES FROM JULY 1, 1888, TO JULY 1, 1889.

	Annual Dues.	Certificates.
Abernethy, Maxwell . . . . . '88	$5 00	
Ahlbrandt, Henry E. . . . . '89	5 00	
Aimar, Charles P. . . . . '88–'89	10 00	
Aird, William . . . . '89	5 00	
Albro, Willis H . . . . '88	5 00	
Alexander, Maurice W. . . . '89	5 00	
Alfreds, Henry J. . . . . '86–'87	10 00	
Allen, Albert W . . . . '88	5 00	
Allen, E. Floyd . . . . '88	5 00	
Anderson, Samuel . . . . . . '89	5 00	
Andrews, Josiah H. . . . . . '89	5 00	
Angney, John R. . . . . . . '88	5 00	
Appleton, Henry K., Jr . '88–'89	10 00	
Armor, Alpheus . . . . . '88–89	10 00	
Armstrong, G. R. '84-85-86-87-88-89	30 00	
Arnold, Robt. B. . . . . . . '88	5 00	
Ashbrook, Chas. S. . . . . . '88	5 00	
Aspinall, Walter A. . . . . . '89	5 00	
Asplin, John H . . . . . '87–'88	10 00	
Atwood, Herman W. . . . . '88	5 00	
Aubley, Samuel . . . . '88	5 00	
Ault, Charles H. . . . . . . '88	5 00	
Averill, William H. . . . . . '88	5 00	
Bacon, Gaston E. . . . . . . '88	5 00	
Baier, Chas. G. . . . . '88	5 00	
Bailey, Frederick . . . . . . '89	5 00	
Baker, T. Roberts . . . . . . '89	5 00	
Baker, Walter T. . . . . . . '88	5 00	
Ball, Charles E. . . . . '89	5 00	
Ballard, John W. . . . . . . '89	5 00	
Balluff, Paul . . . . '88	5 00	
Balser, Gustavus . . . . . . '88	5 00	
Bartells, Geo. C . . . . '88	5 00	
Bartlett, N. Gray . . '86–'87–'88	15 00	
Bassett, Arthur . . . . '88	5 00	
Bassett, Chas. H. . . . . . . '89	5 00	
Bassett, Joseph . . . . '89	5 00	
Bauer, Louis G. . . . . '88	5 00	
Baur, Jacob . . . . '89	5 00	
Bayley, Augustus R . . . '88–'89	10 00	
Bayliss, Lewis F. . . . . . . '89	5 00	
Bechmann, Chas. R . . . . . '89	5 00	
Beckmann, Oscar A . . . . . '88	5 00	
Beckwith, Edmund R . . . . '88	5 00	
Beetem, Jacob S. . . . . . . '88	5 00	
Behrens, Paul J . . . . '88	5 00	
Beitenman, William W. . '88–'89	10 00	
Belt, Z. James . . . . '89	5 00	
Bendiner, Samuel J . . . . . '88	5 00	
Benjamin, James H . . . . . '89	5 00	
Benton, Wilber M . . . '88–'89	10 00	$5 00
Bernhard, Chas. H. . . . '88–'89	10 00	
Berringer, Will J. . . . . . . '88	5 00	
Best, John . . . . '89	5 00	
Betzler, Jacob . . . . . . '87–'88	10 00	
Beyschlag, Chas. . . . . . . '89	5 00	
Biddle, Herbert G . . . . . . '88	5 00	
Amount carried forward . . .	$370 00	$5 00

	Annual Dues.	Certificates.
Amount brought forward . . .	$370 00	$5 00
Billings, Henry M. . . . . . '88	5 00	
Bingham, Chas. C. . . . . . '88	5 00	
Bishop, Francis M. . . . . . '89	5 00	
Bissell, Emery G. . . . . . . '89	5 00	
Bissell, John G. . . . . '89	5 00	
Blahnik, Lorenz . . . . '87	5 00	
Blake, James E . . . . '89	5 00	
Blanding, William B . . . . . '89	5 00	
Blank, Alois. . . . . '89	5 00	
Blocki, William F. '86–'87–'88–'89	20 00	
Borking, Edmund . . . . . . '88	5 00	
Bodemann, Wilhelm . . . . . '88	5 00	
Boerner, Emil L. . . . . . . '88	5 00	
Boggs, Edwin L. . . . . . . '89	5 00	
Bohl, Conrad . . . . '89	5 00	
Bond, John B . . . . '88	5 00	
Bondurant, Chas. S . . . . . '88	5 00	5 00
Borell, Henry A . . . . . '88–'89	10 00	
Boring, Edwin M . . . . . . '88	5 00	
Bostick, Elmer E. . . . . '88–'89	10 00	
Bower, Henry A. . . . . . . '88	5 00	
Boyce, Samuel F. . . . . . . '88	5 00	
Boyd, Geo. W. . . . . '88	5 00	
Boyer, Harry . . . . '88	5 00	
Boynton, Herschell . . . . . '88	5 00	
Brand, Erich . . . . '88	5 00	
Brewster, Wadsworth J. . '88–'89	10 00	
Bristol, Chas. E . . . . '89	5 00	
Brooks, Francis M. . . . '88–'89	10 00	
Brooks, Geo. W . . . . '89	5 00	
Brown, Albert E. . . . . . . '88	5 00	
Brown, Albert P. . . . . . . '88	5 00	
Brown, James. . . . . '88	5 00	7 50
Brown, Robert J. . . . . . . '88	5 00	
Bruce, James . . . . '88	5 00	
Bruck, Philip H. . . . . . . '89	5 00	
Bruguier, Francis . . . . '87–'88	10 00	
Brundage, Fred . . . . '88	5 00	
Brunner, Norman I. . . . '88–'89	10 00	
Brunswig, Lucien W. . . . . '88	5 00	
Bryant, Randolph F. . . . . '88	5 00	
Bryant, William C. . . . . . '89	5 00	
Buck, George . . . . '86–'87–'88	15 00	
Buck, John . . . . '88	5 00	
Buck, John L . . . . '88	5 00	
Bunker, Elihu . . . . '89	5 00	
Buntin, William C. . . . . . '88	5 00	
Bunting, Samuel S. . . . '88–'89	10 00	
Burg, John D. . . . . '88	5 00	
Burge, James O. . . . . . . '88	5 00	
Burkhardt, Mark A . . . . . '88	5 00	
Burley, Edwin P. . . . . '88–'89	10 00	
Burnham, Edward S. . . '88–'89	10 00	
Burns, J. Kellar . . . . '88	5 00	
Burrough, Horace . . . . . . '89	5 00	
Burroughs, Silas M. . . . . . '88	5 00	
Amount carried forward. . . .	$720 00	$17 50

	Annual Dues.	Certificates.		Annual Dues.	Certificates.
Amount brought forward . . .	$720 00	$17 50	Amount brought forward . . .	$1170 00	$17 50
Bush, William . . . . '89	5 00		DeCou, James C. . . . . . . '88	5 00	
Butler, Chas. H . . . . '89	5 00		DeGraff, David . . . . '88	5 00	
Butler, Freeman H. . . . . . '89	5 00		Dedrick, Wm. F. . . . . . . '88	5 00	
Button, Chas. E . . . . . '87–'88	10 00		Deibert, Thos. J. . . . . . . '88	5 00	
Caffee, Amos H . . . . '88	5 00		Deitz, Chas. J. . . . . . . '88	5 00	
Calder, Albert L. . . . . . . '89	5 00		Denham, Chas. S . . . . . . '89	5 00	
Caldwell, James W. . . . '88–'89	10 00		Dennin, Chas . . . . '89	5 00	
Campbell, Samuel . . . . . . '88	5 00		Deutsch, Julius W . . . . . . '88	5 00	
Candidus, Philip C. . . . . . '88	5 00		Dewoody, Wm. L . . . . . . '89	5 00	
Carrell, Eugene A . . . . . . '88	5 00		Diehl, C. Lewis . . . . '88	5 00	
Carter, Solomon. . . . . . . '89	5 00		Dikeman, Nathan . . . . . . '88	5 00	
Caspari, Chas., Jr . . . . . . '89	5 00		Dill, J. Byron . . . . . . '88–'89	10 00	
Casper, Thomas J . . . . . . '89	5 00		Dilly, Oscar C. . . . . '88	5 00	
Cates, Wm. E. . . . . . . '88–'89	10 00		Dobbins, Edw. T . . . . '88–'89	10 00	
Catlin, Ephron . . . . '89	5 00		Dodd, Simon W . . . . . '87–'88	10 00	
Chalin, Louis F . . . . '88	5 00		Dohme, Chas. E. . . . . . . '89	5 00	
Chandler, I. Eugene. . . . . '88	5 00		Dohme, Louis. . . . . '89	5 00	
Chapin, Fred. H. . . . . . . '89	5 00		Dolan, Frank L . . . . '88	5 00	
Chapin, William A. . . . . . '89	5 00		Dolloff, Albert S. . . . . . . '88	5 00	
Chapman, Isaac C . . . . . . '88	5 00		Dougherty, Samuel E . . . . '88	5 00	
Choate, John . . . . '89	5 00		Drake, Chas. W. . . . . . . '88	5 00	
Christiani, Charles. . . . . . '88	5 00		Drake, Jonathan B. . . . . . '87	5 00	
Church, Howard M . . . . . '88	5 00		Drake, John R. . . . . '89	5 00	
Clark, Frank P. . . . . '88	5 00		Drefs, Chas. A. . . . . '88	5 00	
Clarke, Wm. B . . . . '89	5 00		Dreher, Louis . . . . '88	5 00	
Clement, Henry B . . . . . . '89	5 00		Drescher, August. . . . . '88–'89	10 00	
Close, George C . . . . '88	5 00		Dresser, Geo. E . . . . '88	5 00	
Cobb, Ralph L. . . . . . '87–'88	10 00		Duble, Jesse B. . . . . '88	5 00	
Colcord, Jos. W . . . . '88	5 00		Dubois, Wm. L . . . . . '88–'89	10 00	
Cole, Chas. M . . . . '88	5 00		Duckett, Walter G. . . . . . '88	5 00	
Cole, Howson W. . . . . . . '89	5 00		Dudley, Oscar E. . . . . . . '88	5 00	
Colgan, John. . . . . '88	5 00		Dufour, Clarence R . . . . . '88	5 00	
Collins, Albert B. . . . . . . '89	5 00		Duncan, Thurston B. . . . . '88	5 00	
Colton, James B . . . . '88	5 00		Dunn, John A . . . . '89	5 00	
Commings, Chas. S. . . . '88–'89	10 00		Dupont, Wm. . . . . . . '88–'89	10 00	
Cone, John W. . . . . '89	5 00		Durban, Sebastian C . . . . . '85	5 00	
Conger, Frederic A. . . . . . '88	5 00		Durkee, Wm. C . . . . '89	5 00	
Conrad, John . . . . '88	5 00		Eberbach, Ottmar . . . . . . '89	5 00	
Conrath, Adam . . . . '89	5 00		Eberhardt, Ernest G . . . '88–'89	10 00	
Cook, Geo. E . . . . . . '88–'89	10 00		Eberle, Chas. L . . . . '88	5 00	
Cook, Gilbert S . . . . '88	5 00		Eccles, Robert G. . . . . . . '89	5 00	
Cook, Harry C. . . . . '89	5 00		Eckels, Augustus W . . . '88–'89	10 00	
Cook, Thomas P. . . . . '88–'89	10 00		Eckford, Joseph W. . . . '87–'88	10 00	
Coon, James V. D . . . . '88–'89	10 00		Eddy, Henry C . . . . '88	5 00	
Copeland, John W. . . . . . '88	5 00		Edwards, Nathan W. . . . . '88	5 00	
Cornell, Edw. A . . . . '88	5 00		Eggers, Frederick H. . . . . '88	5 00	
Cotton, Wm. H . . . . '89	5 00		Ekstrand, John P . . . . . . '88	5 00	
Coumbe, Oscar H . . . . . . '87	5 00		Elbe, Constantine B . . . '88–'89	10 00	
Cowdin, Geo. H. . . . . . . '89	5 00		Eliel, Leo . . . . '88	5 00	
Craighill, Ed. A . . . . . '88–'89	10 00		Elliott, Henry A. . . . . . . '89	5 00	
Cramer, Max . . . . '89	5 00		Emanuel, Louis . . . 86–'87–88	15 00	
Crawford, Thos. A. . . . . . '88	5 00		Emich, Columbus V . . . . . '89	5 00	
Cressler, Chas. H . . . . '88–'89	10 00		England, Robert. . . . . . . '88	5 00	
Crolius, Frank M. . . . . . . '89	5 00		Erwin, James J . . . . '88	5 00	
Crona, Sixtus E. S. . . . . . '88	5 00		Eschmann, F. W. R . . . . . '88	5 00	
Crossman, Geo. A . . . . '88–'89	10 00		Estabrook, Henry A. . . . . '88	5 00	
Crowther, Frederick A. . . . '89	5 00		Estes, Joseph J . . . . '89	5 00	
Cummings, Theo F. . . . . . '88	5 00		Evans, Joseph S . . . . . '88–'89	10 00	
Curtiss, Chas. G. . . . . . . '88	5 00		Evans, Samuel B. . . . . . . '88	5 00	
Curtman, Chas. O . . . . . . '89	5 00		Feil, Joseph . . . . '88	5 00	
Cushman, Henry C. . . . . . '88	5 00		Fennel, Chas. T. P. . . . . . '89	5 00	
Cutts, Foxwell C., Jr. . . . . '89	5 00		Fenner, Alex. W . . . . . '88–'89	10 00	
Dadd, John A. . . . . '89	5 00		Field, Amos . . . . '88–'89	10 00	
Dale, Wm. M . . . . '87	5 00		Fink, Fred. W. . . . . '88	5 00	
Dana, Edmund, Jr. . . . . . '89	5 00		Finlay, Alex. K . . . . '88	5 00	
Danforth, Edmund C. . . . . '89	5 00		Fischer, Emil A . . . . '88	5 00	
Darrough, Chas. H . . . . . '88	5 00		Fischer, Henry J. . . . . . . '88	5 00	
Davenport, Bennett F . . . . '88	5 00		Fischer, Phil . . . . '88	5 00	
D'Avignon, J. Eugene . . '88–'89	10 00		Fish, Chas. F. . . . . . . '87–'88	10 00	
Davis, Edw. H . . . . '89	5 00		Fisher, Wm . . . . '88	5 00	
Davis, Geo. R . . . . . . '88–'89	10 00		Flanagan, Lewis C. . . . '88–'89	10 00	
Davis, Wm. M. . . . . '89	5 00		Fleck, Jacob J. . . . . '89	5 00	
Davison, John T. . . . . '88–'89	10 00		Fleischer, Adolph T . . . . . '88	5 00	
Dawson, Edw. S., Jr. . . . . '89	5 00		Fleischmann, Augustus T. . . '88	5 00	
Day, Carlos E. . . . . '89	5 00		Ford, W. Thomas.'85–'86–'87–88	20 00	
Day, Chas. W. . . . . '88	5 00		Foster, Wm. O. . . . . '89	5 00	
Amount carried forward. . . .	$1170 00	$17 50	Amount carried forward. . . .	$1650 00	$17 50

	Annual Dues.	Certificates.
Amount brought forward	$1650 00	$17 50
Fougera, Chas. E '88	5 00	
Foulke, Jas '87-'88	10 00	
Fox, Peter P '87	5 00	
Frames, James P '89	5 00	
Francis, Walter R '89	5 00	
Fraser, Horatio N. '88	5 00	
Fraser, Robert P '88	5 00	
Frauer, Herman E '88-'89	10 00	
French, William B. '88	5 00	
Frere, Alex G. '88	5 00	
Frerksen, Richard C. '88	5 00	
Frizelle, Seymour F '88	5 00	
Frohwein, Richard '88	5 00	
Früh, Carl D. S. '88	5 00	
Fuller, Henry W. '87-'88	10 00	
Fuller, Oliver F '87-'88	10 00	
Gallagher, John A '86-'87-'88	15 00	
Galt, Edw. P '88	5 00	
Gardner, Robt. W '88	5 00	
Garrison, Herod D. '86-'87-'88	15 00	
Gates, Amasa O. '88	5 00	
Gates, Howard E '88	5 00	
Gaus, Chas. H. '89	5 00	
Gaus, Louis H. '89	5 00	
Gaylord, Henry C. '88	5 00	
Gegelein, Frederick L '88	5 00	
Geier, Oscar W '88	5 00	
George, Charles T. '88-'89	10 00	
Gessner, Emil A. '89	5 00	
Gibson, Charles '89	5 00	
Giles, Wm. M '88	5 00	
Gill, Geo '89	5 00	
Glimes, Geo. W. '88	5 00	
Godbold, Fabius C. '88-'89	10 00	
Godding, Edw. R '88	5 00	
Godding, John G. '89	5 00	
Goebel, Edward. '88	5 00	
Good, James M '89	5 00	
Goodale, Harvey C. '88-'89	10 00	
Goodman, Chas. F. '88-'89	10 00	
Goodman, Emanuel '89	5 00	
Goodrich, Stephen. 89	5 00	
Goodwin, Eugene R '89	5 00	
Goodwin, Lester H '89	5 00	
Gorgas, Geo. A '88-'89	10 00	
Gosman, Adam J '89	5 00	
Graham, Willis H '89	5 00	
Grandjean, Charles '89	5 00	
Grandjean, Eugene '89	5 00	
Grassly, Chas. W '87-'88	10 00	
Gray, Gilbert D '88	5 00	
Gray, Wm. H. '88	5 00	
Green, Arthur L. '88	5 00	
Green, Benjamin '88	5 00	
Greene, Wm R '88-'89	10 00	
Gregory, Edmund. '89	5 00	
Gregory, Willis G '88	5 00	
Greve, Chas. M '88-'89	10 00	
Greve, Theo. L. A. '89	5 00	
Greyer, Julius '89	5 00	
Griffith, Albert R '87-'88	10 00	
Gross, Edw. Z. '88-'89	10 00	
Grosse, Gottleib M '88	5 00	
Grossklauss, John F '88-'89	10 00	
Grosvenor, Daniel P. '88	5 00	
Grove, John E. '87-'88	10 00	
Gundrum, George '88	5 00	
Haass, G. Herman '89	5 00	
Haber, Louis A '88	5 00	
Haenchen, Chas. E '88	5 00	
Haensgen, H. Otto '88	5 00	
Hahn, Sigismund J. F '88	5 00	
Haigh, De Lagnel '88	5 00	
Haight, Wm. B '88	5 00	
Hall, Chas. E. '88	5 00	
Hall, Chas. K '88-'89	10 00	
Amount carried forward	$2135 00	$17 50

	Annual Dues.	Certificates.
Amouut brought forward	$2135 00	$17 50
Hall, Edwin B. '89	5 00	
Hall, Marshall C '89	5 00	
Hall, Wm. A '88	5 00	
Hallberg, Carl S. N '87	5 00	
Hance, Edw. H '88-'89	10 00	
Hancock, Chas. W '88	5 00	
Hancock, Franklin W '88	5 00	
Hancock, J. F '85-'86-'87-'88-'89	25 00	
Hanson, Arthur E. '88	5 00	
Hanson, Willis T '88-'89	10 00	
Hardigg, Wm. L '88	5 00	
Hardin, John H '88	5 00	
Harlose, Noah S. '89	5 00	
Harper, Harry W '88-'89	10 00	
Harrington, Frank '88	5 00	
Hartshorn, Fred. A. '88-'89	10 00	
Hartwig, Chas. F '87-'88	10 00	
Hassebrock, Henry F '89	5 00	
Hassinger, Samuel E. R. '88	5 00	
Hattenhauer, Robt. C '89	5 00	
Hauenstein, Wm. '86-'87-'88	15 00	
Haussamen, Henry L '88	5 00	
Hawkins, Henry '88	5 00	
Hawkins, M. Smith '89	5 00	
Hays, Horace P. '88	5 00	
Hechler, Geo. L '88	5 00	
Hegeman, J. Niven '88	5 00	
Heinemann, Otto '89	5 00	
Heller, M. M '88	5 00	
Hemm, Francis '89	5 00	
Henderson, Archibald R. '88	5 00	
Henes, Wm. F. '86-'87-'88	15 00	
Hening, James C '88	5 00	
Henry, Charles '89	5 00	
Hepburn, John '88	5 00	
Herbst, Frederick W. '89	5 00	
Hermann, Frederick F. '88	5 00	
Hermann, John G '88-'89	10 00	
Heun, Emil '88	5 00	
Hildreth, Newton G. '89	5 00	
Hill, Justin L '88	5 00	5 00
Hilt, David '88	5 00	
Hinsdale, Samuel J '88	5 00	
Hodgkins, Bert W. '88-'89	10 00	5 00
Hogey, Julius H '87-'88-'89	15 00	
Hohenthal, Chas. F. L. '88	5 00	
Hohley, Chas. '89	5 00	
Holland, Saml. S. '86-'87-'88-'89	20 00	
Hollister, Albert H. '88-'89	10 00	
Holmes, Clayton W '89	5 00	
Holmes, Henry E '88-'89	10 00	
Holt, Alvin E '88-'89	10 00	
Homer, John '88	5 00	
Hood, Chas. I. '89	5 00	
Hopp, Lewis C '88	5 00	
Horn, Wilbur F. '88-'89	10 00	
Hoskinson, J. Thomas '87-'88	10 00	
Howson, Arthur B. '89	5 00	
Howson, Walter H. '89	5 00	
Hoyt, Geo. M. '88	5 00	
Hubbard, John H. '89	5 00	
Huested, Alfred B. '89	5 00	
Hughes, Albert E '88	5 00	
Hughes, Geo '88	5 00	
Huhn, Geo. '88-'89	10 00	
Hunt, Leonard W '88-'89	10 00	
Hurty, John N. '88-'89	10 00	
Huston, Chas. '89	5 00	
Hutchins, Isaiah '89	5 00	
Hyler, Wm. H. '88	5 00	
Ihlefeld, Conrad H. '88	5 00	
Ingalls, Albert O. '87-'88	10 00	
Ingalls, John '88-'89	10 00	
Inglis, Frank '88	5 00	
Ink, Charles E. '88	5 00	
Ink, Parker P. '88	5 00	
Amount carried forward	$2665 00	$27 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$2665 00	$27 50
Irvin, Wm. A. . . . . '89	5 00	
Jacobs, Joseph . . . . . . '88–'89	10 00	
Jacobus, Judson S . . . . '87–'88	10 00	
Jackson, Edw. C. . . . . . . '85	5 00	
James, Frank L . . . . '88	5 00	
James, Wm T. . . . . '88	5 00	
Jamieson, Thos. N. . . . . . '88	5 00	
Jenkins, Luther L . . . . '88–'89	10 00	
Jesson, Jacob . . . . '88	5 00	
Johnson, Chas. B. . . . . . . '89	5 00	
Johnson, John . . . . . . '88–'89	10 00	
Johnston, Harry A . . . . . '88	5 00	
Johnston, Wm., Jr. . . . . . '88	5 00	
Jones, James T . . . . '89	5 00	
Jones, Simon N . . . . '88	5 00	
Jordan, F. Francis . . . . . . '88	5 00	
Jordan, Wm. H . . . . '88	5 00	
Joy, Edwin W. . . . . '89	5 00	
Jungkind, John A . . . . . . '88	5 00	
Jungmann, Julius . . . . . . '88	5 00	
Kadlec, Lawrence W. '87–'88–'89	15 00	
Karb, Geo. J. . . . . '89	5 00	
Kauffman, Geo. B . . . . . . '89	5 00	
Keeler, Wm. H . . . . '88	5 00	
Keene, Thos. R . . . . '88	5 00	
Keller, Fred. P. P. . . . . . '88	5 00	
Kelley, Edw. S. . . . . '89	5 00	
Kellogg, Gardner . . . . . . '88	5 00	
Kelly, Geo. A. . '86–'87–'88–'89	20 00	
Kemp, Edw. . . . . '88	5 00	
Kennard, Frank B. . . . '88–'89	10 00	
Kennedy, Ewen C. . . . . '88	5 00	
Kennedy, Ezra J . . . . . . '88	5 00	
Kennedy, Geo. W. . . . . . '88	5 00	
Kent, Henry A., Jr. . . . . . '88	5 00	
Kephart, Henry . . . . '88	5 00	
Keppler, Christian L. . . . . '88	5 00	
Kerr, Wm. W. . . . . '88	5 00	
Kessler, Edw. F. . . . . . . '88	5 00	
Kienth, Hans . . . . '89	5 00	
Kilmer, Frederic B. . . . . . '88	5 00	
King, W. B. . '84–'85–'86–'87–'88	25 00	
Kirchgasser, Wm. C . . . '88–'89	10 00	7 50
Kirchhofer, P. Paul . . . . . '88	5 00	
Kitchen, Chas. W. . . . . . '88	5 00	
Klayer, Louis . . . . '89	5 00	
Klie, G. H. Chas. . . . . . . '89	5 00	
Kline, Mahlon N. . . . . '88–'89	10 00	
Knabe, Gustavus A. . '86–'87–'88	15 00	
Knock, Thos. F. . . . . . . '89	5 00	
Knoefel, August . . . . . . '88	5 00	
Kochan, John . . . . '88	5 00	
Krehe, J. Theo. . . . . '89	5 00	
Krewson, Wm. E. . . . . '87–'88	10 00	
Krieger, Philip . . . . '89	5 00	
Krosekop, Wm. B . . . . '88–'89	10 00	
Kuhlmeier, Henry . . . . . . '88	5 00	
Kuhn, Norman A . . . . '88–'89	10 00	
Kurfurst, Henry F. . . . . . '89	5 00	
Labold, Jos. M. . . . . '88	5 00	
Lachance, Seraphin . . . '88–'89	10 00	
Lahme, Chas. A . . . '86–'87–'88	15 00	
Laing, Alfred A . . . . . '88–'89	10 00	7 50
Lambert, John A. . . . . '88–'89	10 00	
Lammert, C. Jos. . . . . . . '88	5 00	
Land, Robt. H . . . . '88	5 00	
Lander, John C. . . . '86–'87–'88	15 00	
Last, Louis C. A. . . . . . . '88	5 00	7 50
Lauer, Michael J. . . . . . . '88	5 00	
Laurent, Eugene L . . . '88–'89	10 00	
Lawton, Chas. H. . . . . . . '89	5 00	
Lawton, Horace A. . . . . . '89	5 00	
Lehn, Louis . . . . '87–'88	10 00	
Lehr, Philip . . . . '88	5 00	
Leis, Geo . . . . '88	5 00	
Leist, Jacob L . . . . . . '88–'89	10 00	
Amount carried forward . . .	$3200 00	$50 00

	Annual Dues.	Certificates.
Amount brought forward . . .	$3200 00	$50 00
Leith, Harvey I. . . . . '89	5 00	
Levy, Adolph . . . . '88	5 00	
Lilly, Eli . . . . '88–'89	10 00	
Livingston, Barent V. B . . . '89	5 00	
Llewellyn, John F. . . . . . '88	5 00	
Lloyd, John U. . . . . '89	5 00	
Lockhart, Geo B . . . . . . '88	5 00	
Loehr, Theo C . . . . '88	5 00	
Loomis, John C . . . . . '88–'89	10 00	
Lord, Thos. . . . . . '87–'88–'89	15 00	
Lowd, John C. . . . . '89	5 00	
Ludlow, Chas. . . . . '89	5 00	
Lyman, Asahel H . . . . . . '88	5 00	
Lyons, Isaac L. . . '86–'87–'88–'89	20 00	
Macdonald, Daniel T. . . . . '89	5 00	
Maclagan, H. . . '85–'86–'87–'88	20 00	
Macmahan, Thos. J . . . . . '88	5 00	
Main, Thos. F. . . . . . '88–'89	10 00	
Maisch, Henry C. C. . . . . '89	5 00	
Major, John R. . . . . '88	5 00	
Mallinckrodt, Edw. . . . . . '89	5 00	
Markoe, Geo. F. H . . . . . '89	5 00	
Marquardt, Jacob F. . '86–'87–'88	15 00	
Marshall, Ernest C. . . . '88–'89	10 00	
Marsteller, Geo. L . . . '88–'89	10 00	
Martin, Hugo W. C. . '86–'87–'88	15 00	
Martin, John C. . . . '86–'87–'88	15 00	
Masi, Frederick H. . . . . . '88	5 00	
Mason, Alfred H. . . . . . . '89	5 00	
Mason, Norman N. . '86–'87–'88	15 00	
Massey, Wm. N. . . . '86–'87–'88	15 00	
May, Arthur F . . . . '88	5 00	
May, James O. . . . . . '88–'89	10 00	
Mayell, Alfred . . . . '88	5 00	
Maynard, Henry S. . '86–'87–'88	15 00	
McCarthy, Cornelius J. . . . '88	5 00	
McClure, Wm. H . . . . . . '89	5 00	
McDonald, Geo . . . . '88	5 00	
McElhenie, Thos. D. . . . . '89	5 00	
McElwee, Emer J . . . . . . '88	5 00	
McFarland, Thad. D. . . . . '88	5 00	
McIntyre, Byron F. . . . '87–'88	10 00	
McIntyre, Wm . . . . '89	5 00	
McKesson, G. Clinton . . . . '88	5 00	
McKesson, John, Jr. . . . . '88	5 00	
Mehringer, Joseph A. . . . . '86	5 00	
Meininger, Albert . . . . . . '89	5 00	
Meissner, Paul E. . . . . '88–'89	10 00	
Melchers, Henry . . . . . . '88	5 00	
Mellon, John J. . . . '86–'87–'88	15 00	
Menkemeller, Chas. . . . . . '88	5 00	
Mennen, Gerhard . . . . . . '88	5 00	
Menninger, Henry J. . . . . '88	5 00	
Merrell, Ashbel H . . '88–'89–'90	15 00	
Merrell, Chas. G. . . . . '88–'89	10 00	
Merrell, George . . . . . '88–'89	10 00	
Metz, Abraham L . . . . . . '88	5 00	
Meyer, Christian F. G. . . . '89	5 00	
Michaelis, Chas. O . . . . . '88	5 00	
Michaelis, Gustavus . . . . . '89	5 00	
Milburn, John A. . . . . . . '88	5 00	
Milburn, Washington C. . . . '88	5 00	
Miller, Jacob A. . . . . . '88–'89	10 00	
Miller, Jason A . . . . '89	5 00	
Miller, Otho F. S. . . . . . . '88	5 00	
Milligan, Decatur . . . . . . '88	5 00	
Miner, Maurice A. . . . . . '88	5 00	
Mingay, James . . . . . . '87–'88	10 00	
Miville, Francis C. . . . . . '88	5 00	
Mohr, Chas. . . . . '88	5 00	
Moore, George . . . . . . '88–'89	10 00	
Moore, Joachim B. . . . . . '88	5 00	
Moore, John T. . . . . . '88–'89	10 00	
Moore, Silas H . . . . . '88–'89	10 00	5 00
Moore, Thos. F. . . . '86–'87–'88	15 00	
Moore, Arthur J. . . . . . . '88	5 00	
Amount carried forward . . .	$3785 00	$55 00

	Annual Dues.	Certificates.
Amount brought forward	$3785 00	$55 00
Morgan, Benj. G. '86	5 00	
Morris, Lemuel I. '88	5 00	
Morrison, Jos. E. '88	5 00	
Morse, C. Milan '88–'89	10 00	7 50
Mosher, Rosa B '88	5 00	
Mowry, Albert D '89	5 00	
Mueller, Adolphus '89	5 00	
Mueller, Louis H '88	5 00	
Mueller, Otto E '88	5 00	5 00
Munson, Luzerne I. '88	5 00	
Murray, Bernard J. '87–'88	10 00	
Musler, Abram '88	5 00	
Myers, Daniel '89	5 00	
Nattans, Arthur '88	5 00	
Newbold, Thos. M. '88–'89	10 00	
Newman, George A '88	5 00	
Nichols, John C '88	5 00	
Nichols, Thos. B. '88	5 00	
Nicot, Louis E. '88	5 00	
Nipgen, John A '89	5 00	
Nisbet, Wm. W. '86–'87–'88	15 00	
Noble, John J '88–'89	10 00	
Norton, Edw. B '88	5 00	
O'Brien, James J '88	5 00	
O'Hare, James '88–'89	10 00	
O'Neil, Henry M. '87–'88	10 00	
Ohliger, Lewis P. '88	5 00	
Oldberg, Oscar '85–'86–'87–'88	20 00	
Oleson, Olaf M '88	5 00	
Oliver, Wm. M '87	5 00	
Orne, Joel S. '89	5 00	
Osgood, Hugh H. '88	5 00	
Osmun, Chas. A. '88	5 00	
Otis, Clarke Z '88	5 00	
Ottinger, Jas. J '89	5 00	
Owens, James A. '89	5 00	
Owens, Richard J '89	5 00	
Padley, Wm. A '88	5 00	
Paine, Milton K '88	5 00	
Palmer, J. Dabney '88–'89	10 00	
Panknin, Chas. F. '88–'89	10 00	
Parcher, Geo. A '89	5 00	
Parker, Geo. H '89	5 00	
Parker, John H '88	5 00	
Parkhill, Stanley E '88	5 00	
Parsons, John '87–'88	10 00	
Partridge, Chas. K '88–'89	10 00	
Patch, Edgar L '89	5 00	
Patton, John F '89	5 00	
Patterson, Theo. H '87–'88	10 00	
Pauley, Frank C. '89	5 00	
Pease, Francis M '89	5 00	
Peck, Geo. L '89	5 00	
Pennington, T. H. Sands. '87–'88	10 00	
Perkins, Benj. A. '89	5 00	
Perkins, Wm. A. '89	5 00	
Perry, Fred. W. R. '88	5 00	
Pettengill, Edw. T. '88	5 00	
Peyton, Robert D '88	5 00	
Pfingst, Edw. C '88	5 00	
Pfingst, Henry A. '88	5 00	
Pfingsten, Gustavus '88	5 00	
Phelps, Dwight '88	5 00	
Phillips, Edwin F. '88–'89	10 00	7 50
Physick, Henry S '88	5 00	7 50
Pieck, Edw. L. '88–'89	10 00	
Pilsbury, Frank O '89	5 00	
Pitt, John R., Jr. '88	5 00	
Plummer, David G. '88	5 00	
Porter, Chilton S. '88	5 00	
Porter, Henry C '89	5 00	
Post, Elisha '88–'89	10 00	
Powell, Thos. W '86–'87–'88	15 00	
Power, Frederick B '89	5 00	
Prall, Delbert E '88	5 00	
Prentice, Fred. F. '88	5 00	
Amount carried forward	$4275 00	$82 50

	Annual Dues.	Certificates.
Amount brought forward	$4275 00	$82 50
Prescott, Albert B '89	5 00	
Preston, Andrew P. '88	5 00	
Price, Chas H. '88	5 00	
Price, Joseph '88	5 00	
Puchner, Wm. A. '88	5 00	
Pursell, Howard '88–'89	10 00	
Rademaker, Herman H '88	5 00	
Ramsperger, Gustavus '88–'89	10 00	
Rankin, Jesse W '85–'86–'87–'88	20 00	
Rapelye, Chas. A '89	5 00	
Rascoe, Lucius '88	5 00	
Redsecker, Jacob H '88	5 00	
Reed, Isaac N. '89	5 00	
Reichardt, F. Alfred '88	5 00	
Reinhold, Wm '86–'87–'88	15 00	
Rendigs, Chas. P '89	5 00	
Renz, Fred. J '88	5 00	
Reusch, Ernst '89	5 00	
Reynolds, Chas. E. '88	5 00	
Reynolds, Howard P. '89	5 00	
Reynolds, Wm K. '89	5 00	
Rhoades, Stephen H '89	5 00	
Rhode, Rudolph E '88–'89	10 00	
Rice, Charles '89	5 00	
Rich, Willis S '88–'89	10 00	
Richardson, James. '89	5 00	
Richardson, J. Clifford '89	5 00	
Rickey, Chas. F. '89	5 00	
Ricksecker, Theodore '88	5 00	
Ridgway, Lemuel A. '87–'88	10 00	
Riesenman, Joseph. '88	5 00	
Riley, Charles W '88	5 00	
Robbins, Alonzo. '89	5 00	
Robertson, A. C. '85–'86–'87–'88	20 00	
Robin, Oscar '88	5 00	
Robinson, Edward A. '88–'89	10 00	
Robinson, James S. '88	5 00	
Robinson, William S '86–'87–'88	15 00	
Rockefeller, Lucius '88–'89	10 00	
Rogers, Arthur H '88	5 00	
Rogers, Wiley '88	5 00	
Rogers, William H. '89	5 00	
Rohlfing, C. H. F. '88	5 00	
Rosengarten, Mitchell G '89	5 00	
Ross, Ellison H '88	5 00	
Ross, Wm. H. '88	5 00	
Rudolph, Eliza. '88	5 00	
Ruete, Theo. W. '88	5 00	
Ruppert, John. '89	5 00	
Russell, Elias S '87	5 00	
Ryerson, Henry O. '89	5 00	
Sanderson, Stephen F. '86–'87–'88	15 00	
Sands, Geo. G. '88	5 00	
Sargent, Ezekiel H. '87–'88	10 00	
Sauerhering, Rudolph A '89	5 00	
Sautter, Louis. '89	5 00	
Sayre, Edward A. '87–'88	10 00	
Sayre, Lucius E '88–'89	10 00	
Sayre, Wm. H. '87–'88	10 00	
Schaaf, Justus H. '89	5 00	
Schafer, Geo. H. '88	5 00	
Schafhirt, Adolph J '88	5 00	
Schambs, Geo. M '88	5 00	
Scheffer, Emil '88	5 00	
Scheffer, Henry W. '88	5 00	
Schellentrager, E. A '88	5 00	
Scherer, Andrew. '87–'88	10 00	
Scherff, John P '89	5 00	
Scherling, Gustav '88	5 00	
Schermerhorn, Winfield S. '89	5 00	
Schiemann, Edw. B '88	5 00	
Schlaepfer, Henry J '89	5 00	
Schley, Steiner. '86–'87–'88	15 00	
Schlotterbeck, Julius O. '88	5 00	
Schmid, Henry. '87–'88	10 00	
Schmidt, Ferdinand T '88	5 00	
Amount carried forward	$4790 00	$82 50

	Annual Dues.	Certificates.
Amount brought forward . . .	$4790 00	$62 50
Schmidt, Florian C. . . . . . '88	5 00	
Schmidt, Frederick M. . . . '88	5 00	
Schmidt, Joseph M. . . . . . '89	5 00	
Schoenhut, Christian H. . . . '88	5 00	
Schoettlin, Albert J. . . . . . '88	5 00	
Scholtz, Edmund L. . . . '87–'88	10 00	
Schrader, Henry . . . . . '88–'89	10 00	
Schranck, C. Henry . . . . . '89	5 00	
Schueller, Ernst . . . . . . '89	5 00	
Schueller, Frederick W. . . . '89	5 00	
Schumann, Theo. . . . . . . '86	5 00	
Scofield, James S. . . . . '88	5 00	
Scott, Wm. J., '84–'85–'86–'87–'88	25 00	
Scoville, Chas. E. . . . . . . '88	5 00	
Searby, Wm. M. . . . . . . '88	5 00	
Seitz, Oscar . . . . '88	5 00	
Sennewald, Ferdinand W. . . '89	5 00	
Seykora, Edwin J. . . . . '88	5 00	
Sharpless, Stephen P. . . . . '89	5 00	
Shaw, Robt. J. . . . . '89	5 00	
Sheffield, Wm. E. . . . . . . '87	5 00	5 00
Shiels, Geo. E. . . . . '88	5 00	
Sherwood, Louis W. . . . . '89	5 00	
Shinn, James T. . . . . . . '89	5 00	
Shivers, Chas. . . . . '88	5 00	
Shoemaker, Richard M. . . . '89	5 00	
Shorb, J. Eagan . . . . '86	5 00	
Shrader, John L. . . . . . . '88	5 00	
Shriver, Henry . . . . '88	5 00	
Shryer, Thomas W. . . . '88–'89	10 00	
Shurtleff, Israel H. . . . . . '89	5 00	
Siegenthaler, Harvey N. . . '89	5 00	
Simmon, Karl . . . . '86–'87–'88	15 00	
Simms, Giles G. C. . . . . . '88	5 00	
Simon, Wm. . . . . '89	5 00	
Simonson, Wm. . . . . '89	5 00	
Simpson, Wm. . . . . '88	5 00	
Simson, Francis C. . . . . '88–89	10 00	
Sitton, Chas. E. . . . . '89	5 00	
Skelly, James J. . . . . '88	5 00	
Slater, Frank H. . . . . '88–'89	10 00	
Sloan, Geo. W. . . . . . '88–'89	10 00	
Slocum, Frank L. . . . . . . '88	5 00	
Slosson, Frank W. . . . . . '88	5 00	
Slosson, George . . . . '88	5 00	
Smith, Chas. B. . . . . . '87–'88	10 00	
Smith, Henry . . . . '88	5 00	
Smith, Israel P. . . . . . '87–'88	10 00	
Smith, J. Hungerford . . . . '88	5 00	
Smith, Linton . . . . '89	5 00	
Smith, Willard . . . . '88	5 00	
Smith, Willard A. . . . . . . '88	5 00	
Smithnight, Albert, '85–'86–'87–'88	20 00	
Snively, Andrew J. . . . . . '88	5 00	
Snow, Chas. W. . . . . '89	5 00	
Snow, Herbert W. . . . . . '88	5 00	
Snyder, Alva L. . . . . . '88–'89	10 00	
Snyder, Robt. J. . . . . . . '88	5 00	
Soetje, Edw. C. . . . . . . '88	5 00	
Sohn, Frank . . . . '88	5 00	
Sohrbeck, G. Henry. . . . . '88	5 00	
Spalding, Warren A. . . . . '89	5 00	
Spangler, H. W. . . . . . . '88	5 00	
Spannagel, Chas. C. . . . . . '88	5 00	
Spengler, John G. . . . . '87–'88	10 00	
Spenzer, Peter I. . . . . . . '88	5 00	
Sperry, Herman J. . . . . . '89	5 00	
Spitzer, Geo. . . . . '88	5 00	
Spofford, Chas. B. . . . . . '88	5 00	
Squibb, Edw. H. . . . . . . '89	5 00	
Squibb, Edw. R. . . . . . . '89	5 00	
Stacey, Benj. F. . . . . . '88–'89	10 00	
Stahler, Wm. . . . . '89	5 00	
Stam, Colin F. . . . . '88	5 00	
Stamford, Wm. H. . . . . '87–'88	10 00	
Stanley, E. C. . . . . '88	5 00	
Amount carried forward . . .	$5275 00	$87 50

	Annual Dues.	Certificate.
Amount brought forward . . .	$5275 00	$87 50
Starr, Thomas. . . . . . . '88	5 00	
Stearns, Henry A. . . . . . . '88	5 00	
Stein, Jacob H. . . . . '89	5 00	
Steinhauer, Frederick . '86–87–'88	15 00	
Stevens, Alonzo B. . . . . . '89	5 00	
Stevens, Fred. D. . . . . . '88	5 00	
Stevens, S. Henry . . . . . . '88	5 00	
Stevens, Luther F. . . . . . '88	5 00	
Stewart, Francis E. . . . . . '88	5 00	
Stierle, Adolph. . . . '87–'88–'89	15 00	
Stollenwerk, Alphonse L. . . '88	5 00	
Stone, Clarence G. . . . . '87–'88	10 00	5 00
Stone, Maurice L. . . . . '88–'89	10 00	5 00
Strassel, Wm . . . . '88	5 00	
Strathman, Chas. A. . . . '88–'89	10 00	
Stryker, Cornelius W. . . . . '88	5 00	
Tartiss, Alfred J. . . . . . . '89	5 00	
Taylor, Celia W. . . . . '88–'89	10 00	
Taylor, John P. . . . . . . '89	5 00	
Test, Alfred W. . . . . '88	5 00	
Thatcher, Joseph H. . . . . '88	5 00	
Thatcher, Hervey D . . . '88–'89	10 00	
Thomas, James, Jr. . . . . . '88	5 00	
Thomas, Oscar E. . . . . . '86	5 00	
Thomas, Robt., Jr. . . . . . '88	5 00	
Thompson, Frank A. . . . . '88	5 00	
Thompson, James L . . . . '88	5 00	
Thompson, Wm. Scott. . . . '88	5 00	
Thompson, Wm. S. . . . . . '89	5 00	
Thomsen, John J. . . . . . '89	5 00	
Thomsen, John J., Jr. . . . '89	5 00	
Thorn, Henry P . . . . . . '89	5 00	
Thurber, Almon R. . . . '86–'87	10 00	
Thurston, Azor . . . . . '88–'89	10 00	
Tibbs, Wm. H. . . . . . '87–88	10 00	
Tiernan, Frank M. . '85–'86–'87	15 00	
Tobey, Chas. W. . . . . . . '88	5 00	
Todd, Albert M. . . . . . . '89	5 00	
Todd, Wm. J. . . . . '86–'87–'88	15 00	
Tomfohrde, John W. . . . . '89	5 00	
Topley, James . . . . '89	5 00	
Torbert, Willard H. . . . . . '89	5 00	
Tower, Levi. . . . . '88	5 00	
Trask, Chas. M. . . . . . . '89	5 00	
Travis, J. Walton . . . . . . '88	5 00	
Treat, Jos A. . . . . '89	5 00	
Trimble, Henry . . . . '89	5 00	
Truax, Chas. . . . . . . '87–'88	10 00	
Tschepp, Adolph . . . . . . '88	5 00	
Tucker, Mosely F. . . . . . '88	5 00	
Turner, Geo. H. . . . . . . '89	5 00	
Turner, Isaac W. . . . . . . '88	5 00	
Ude, George . . . . '89	5 00	
Uhlich, Ferdinand G. . . . . '89	5 00	
Upson, Rosa . . . . '88	5 00	
Urban, Jacob P. . . . . . . '88	5 00	
Van Antwerp, Garet . . . . . '88	5 00	
Van Auken, Jerrie A. . . . . '88	5 00	
Vandergrift, John A. . . . . '88	5 00	
Van Winkle, Abraham W. '87–'88	10 00	
Vaughan, Perry W. . . . . . '88	5 00	
Vennard, Wm. L. . . . . . . '88	5 00	
Viallon, Paul L. . . . . '88	5 00	
Vilter, Herman . . . . '89	5 00	
Vordick, August H. . . . . . '89	5 00	
Voss, Geo. W. . . . . '89	5 00	
Wackerbarth, John . . . . . '88	5 00	
Wagner, Geo. W., Jr. . . . . '88	5 00	
Wagner, Henry . . . . '89	5 00	
Wahmhoff, Julius H. . . . . '88	5 00	
Walbrack, Arthur. '86–'87–'88–'89	20 00	
Walch, Robt. H. . . . . . . '88	5 00	
Walker, Anselle . . . . '89	5 00	
Walker, John P. . . . . . . '89	5 00	
Walker, Wm. J. . . . . '89	5 00	
Walling, Walter A. . . . . '88–89	10 00	
Amount carried forward . . .	$5675 00	$97 50

	Annual Dues.	Certificates.
Amount brought forward	$5675 00	$97 50
Walton, Joseph R '88	5 00	
Wangler, Conrad D '89	5 00	
Ward, Benjamin '88	5 00	
Warn, Wm. E. '89	5 00	
Warne, Henry L. '86–'87	10 00	
Warren, Edwin A. '88	5 00	
Watson, Herbert K '88	5 00	
Watson, Sidney P '88–'89	10 00	
Watson, Wm. H. '88	5 00	
Waugh, Geo. J '88	5 00	
Wearn, Wm. H '88–'89	10 00	7 50
Weaver, John A. '89	5 00	
Webb, Wm. H '89	5 00	
Webber, J. Le Loy '89	5 00	
Weber, Wm. '88	5 00	
Wehrly, Thomas M '88	5 00	
Weidemann, Chas. A '88	5 00	
Weills, Wm. M. L. '88–'89	10 00	
Weimnan, Oscar C '86–'87–'88	15 00	
Weiser, Emilius I. '89	5 00	
Wellington, Arthur W. '88	5 00	
Wells, Ebenezer M '88	5 00	
Wells, Jacob D '89	5 00	
Wells, Romanta '89	5 00	
Wendell, Henry E. '88	5 00	
Westmann, F. H '89	5 00	
Wetterstroem, Albert '88	5 00	
Weusthoff, Otto S. '89	5 00	
Weyer, John '89	5 00	
Whall, Jos. S '88	5 00	
Wharton, John C. '88–'89	10 00	
Wharton, Wm. H '85–'86	10 00	
Wheeler, Leonard H. '89	5 00	
Whitcomb, Frederick E. '88	5 00	
White, Geo. H '89	5 00	
Whiting, Frederick T '89	5 00	
Whitman, Nelson S '88–'89	10 00	
Whitney, Henry M '89	5 00	
Wickham, Wm. H '88	5 00	
Amount carried forward	$6005 00	$105 00
Amount brought forward	$6005 00	$105 00
Wienges, Conrad '88	5 00	
Wight, Oscar M. '88	5 00	
Wilcox, Frederick '88	5 00	
Wiley, Goodwin R. '87	5 00	
Wilkes, Arthur P '88	5 00	
Williams, Chas. F. '88	5 00	
Williams, Geo. G '88	5 00	
Williams, John K '89	5 00	
Williams, Richard W '89	5 00	
Williams, Seward W. '88	5 00	
Williams, Wm. H '88	5 00	
Wilson, Albert H '88–'89	10 00	
Wilson, Benj. O. '89	5 00	
Wilson, Frank M '89	5 00	
Wilson, Julius H. '87–'88	10 00	
Winslow, Edwin C '89	5 00	
Winters, John H. '88	5 00	
Wolfe, Nathaniel '88	5 00	
Wood, Edw. S '89	5 00	
Wood, Mason B '87–'88	10 00	
Woodruff, Roderick S '88	5 00	
Wooldridge, Napoleon '88	5 00	
Woolley, Stephen D. '88	5 00	
Wray, Geo. B. '88	5 00	
Wright, Archibald W '88	5 00	
Wright, Edw. E. '89	5 00	
Wynn, Wm '88–'89	10 00	
Yeager, Alvin A. '88	5 00	
Young, John K '88–'89	10 00	
Young, William '88	5 00	
Zahn, Emil A '87–'88	10 00	
Zeller, Wm. S '88	5 00	
Ziegler, Philip M '89	5 00	
Zimmerman, Chas. '89	5 00	
Zinck, Chas. M '88	5 00	
Zoeller, Edw. V '88–'89	10 00	
Zuenkeler, John F. '89	5 00	
Zwrick, Geo. A. '89	5 00	
Total	$6230 00	$105 00

LIST OF NEW MEMBERS.

1. *Delegates becoming members.*

J. N. Anderson, Conway, Mo.
C. A. Bayley, San Francisco, Cal.
Chas. F. Dare, Bridgeton, N. J.
Chas. J. Daubach, Lincoln, Neb.
F. A. Druehl, Chicago, Ill.
G. Eyssell, Kansas City, Mo.
J. H. Flint, Marysville, Cal.
Jas. Forsyth, Omaha, Neb.
H. M. Griffin, Fort Dodge, Ia.
A. Mann, Ann Arbor, Mich.
S. Oberdeener, Santa Clara, Cal.
F. E. Ray, Sacramento, Cal.
C. Weschcke, New Ulm, Minn.

2. *Members by proposition and election.*

Philip Acker, Cleveland, O.
A. A. W. Bley, Pasadena, Cal.
Louis Blumauer, Portland, Ore.
Barth. Bossidy, Waterbury, Conn.
Jas. W. Bradley, Yreka, Cal.
John J. Buehler, Los Angeles, Cal.
Geo. H. Clapp, East Oakland, Cal.
Louis G. Clarke, Portland, Ore.
N. Dixon Dietrick, Portland, Ore.
Robert H. Dimock, New Haven, Conn.
J. S. Drury, Bakersfield, Cal.
Jesse J. Dunagan, Denver, Col.
Wm. H. Ebbitt, New York, N. Y.
Adolf Ekman, Oroville, Cal.
Clarence L. Eschman, Phœnix, Arizona.
Fred. C. Ewing, Glenwood Springs, Col.
Julius Fahlen, St. Louis, Mo.
John B. Farlow, Salt Lake City, Utah.
Hamilton Fay, Santa Cruz, Cal.
N. H. Finley, Rochester, Pa.
Geo. B. Flint, Oakland, Cal.
David H. Galloway, Chicago, Ill.
Jos. F. Geisler, New York, N. Y.
Henry B. Gilpin, Baltimore, Md.
Albert W. Grant, San Francisco, Cal.
Robert M. Green, Oroville, Cal.
A. G. Gutierrez, Santa Barbara, Cal.
Ben Hastings, San Francisco, Cal.
Edward A. Hay, Portland, Me.
Sigmund W. Heinitsh, Lancaster, Pa.
Wm. L. Helke, San Francisco, Cal.
Francis M. Hilby, Monterey, Cal.
Isaac D. Holden, Stockton, Cal.
Fred. B. Hulting, San Francisco, Cal.
D. D. Hunt, San Francisco, Cal.
G. J. C. S. Joergensen, La Conner, Wash. Territory.
Arthur S. Johnson, Charlottetown, P. E. I.
John Jones, Jr., Gold Hill, Nev.
Fred. C. Keil, San Francisco, Cal.
Derwentwater Kirkland, Oakland, Cal.
A. A. Kleinschmidt, Memphis, Tenn.
S. T. Kostitch, Leadville, Col.
Bruno O. Kostka, Lincoln, Neb.
Jno. M. A. Laue, Portland, Ore.
Aug. Lernhart, Centreville, Cal.
Frank J. Lord, Denver, Col.
Jas. Maclise, Oakland, Cal.
John H. Manning, Pittsfield, Mass.
Robert S. Martin, San Francisco, Cal.
Winfield S. McCartney, Selma, Cal.
Chas. G. Miller, Greenville, Tenn.
James M. Miller, Vacaville, Cal.
Wm. Miller, Santa Monica, Cal.
J. H. Munson, Philadelphia, Pa.
Stephen A. Neppach, Portland, Ore.
Lewis E. Norton, Oroville, Cal.
William Pfunder, Portland, Ore.
Edward Plummer, New York City.
Adolph A. Poehner, Philadelphia, Pa.
Chas. A. Price, Denver, Col.
Victor A. Quabe, St. Paul, Minn.
Ed. B. Rives, Los Angeles, Cal.
Ernest F. Robinson, Toronto, Can.

John C. Scribner, Angel's Camp, Cal.
Eugene A. Sherwin, Wallace, Ihaho.
A. D. Smith, Manchester, N. H.
Samuel W. Smith, Ansonia, Conn.
Wm. C. Smith, Oakland, Cal.
John G. Tanner, Santa Cruz, Cal.
Miles B. Travis, Saybrook, Ill.
Wm. A. Viall, Ithaca, N. Y.
Diedrich Vogt, Charleston, S. C.
Willard C. Welch, San Francisco, Cal.
Richard E. White, San Francisco, Cal.
Frank M. Wilkins, Eugene, Ore.
C. H. Woodard, Portland, Ore.
Wm. F. Woodward, Portland, Ore.

LIST OF MEMBERS AND DELEGATES IN ATTENDANCE AT SAN FRANCISCO.

Names of delegates indicated by *; delegates not members *†.

* Alexander, M. W., St. Louis, Mo.
* Andrews, J. H., Seymour, Ind.
Armstrong, C. W., Calistoga, Cal.
* Bartells, Geo. C., Camp Point, Ill.
Bartlett, Smith, New York.
* Bayley, A. R., Cambridge, Mass.
* Bayley, C. A., San Francisco, Cal.
Beckett, Fred. A., San Francisco, Cal.
* Bedford, P. W., New York City.
Benjamin, Jas. H., Brooklyn, N. Y.
Buehler, J. J., Los Angeles, Cal.
* Calvert, Jno., San Francisco, Cal.
Chapman, P. F., Porterville, Cal.
Clapp, Geo. H., E. Oakland, Cal.
* Dare, Chas. F., Bridgeton, N. J.
* Daubach, Chas. J., Lincoln, Neb.
Dawson, J. H., San Francisco, Cal.
* Devine, Jno., San Francisco, Cal.
* Dewoody, Wm. L., Pine Bluff, Ark.
* Dobme, Chas. E., Baltimore, Md.
* Druehl, F. A., Chicago, Ill.
* Ebert, Albert E., Chicago, Ill.
Eckford, J. W., Aberdeen, Miss.
Ekman, Adolf, Oroville, Cal.
Elbe, C. B., Alameda, Cal.
* Eliel, Leo, South Bend, Ind.
Eschman, C., Phoenix, Arizona.
* Eyssell, Geo., Kansas City, Mo.
* Field, Amos, Omaha, Neb.
* Fleischer, A. T., Chicago, Ill.
* Fleischman, A. T., Sedalia, Mo.
Flint, Geo. B., Oakland, Cal.
* Flint, J. H., Marysville, Cal.
* Forsyth, Jas., Omaha, Neb.
* Goodman, C. F., Omaha, Neb.
Grant, A. W., San Francisco, Cal.
Green, R. M., Oroville, Cal.
* Griffin, H. M., Fort Dodge, Ia.
*† Griffin, L. W., Boston, Mass.
Haber, L. A., Cleveland, O.
* Hallberg, C. S., Chicago, Ill.
Hastings, Ben, San Francisco, Cal.
Hattenhauer, Rob. C., Peru, Ill.
* Hechler, G. L., Cleveland, O.
Heilman, R. P., Emporium, Pa.
* Heinitsh, Chas. A., Lancaster, Pa.
Helke, W. L., San Francisco, Cal.
Hilby, F. M., Monterey, Cal.
Holden, I. D., Stockton, Cal.
* Hopp, Lewis C., Cleveland, O.
Hulting, F. B., San Francisco, Cal.
Hunt, D. D., San Francisco, Cal.
James, Frank L., St. Louis, Mo.
* Johnson, C. B., Middletown, O.
Keil, Fred. C., San Francisco, Cal.
* Kennedy, G. W., Pottsville, Pa.
* Kilmer, F. B., New Brunswick, N. J.
Kirkland, D., Oakland, Cal.
Kitchen, C. W., Brooklyn, N. Y.
* Kuhn, N. A., Omaha, Neb.
Laue, J. M. A., Portland, Ore.
Loomis, Jno. C., Jeffersonville, Ind.
Maclise, Jas., Oakland, Cal.
* Main, Thos. F., New York City.
* Maisch, J. M., Philadelphia.
* Mann, Albert, Ann Arbor, Mich.
Manning, J. H., Pittsfield, Mass.
Martin, Rob. S., San Francisco.
Mayer, Bernard, Mayfield, Cal.
McCartney, W. S., Selma, Cal.
*† McKenney, J. F., Shelbyville, Ky.
* McNeil, J. M., Scottdale, Pa.
*† Melvin, S. H., E. Oakland, Cal.
* Mennen, Gerhard, Newark, N. J.

* Moore, Silas H., Sioux City, Ia.
* Oberdeener, S., Santa Clara, Cal.
* Painter, Emlen, New York City.
*† Parsons, C. W., Detroit, Mich.
Peyton, R. D., Louisville, Ky.
Pfunder, Wm., Portland, Ore.
Phelan, C. E., Lakeport, Cal.
* Pieck, E. L., Covington, Ky.
Plummer, Edw., New York City.
Potter, S., San Francisco, Cal.
* Ramsperger, G., New York City.
* Ray, Fred. E., Sacramento, Cal.
Redsecker, J. H., Lebanon, Pa.
Rives, E. B., Los Angeles, Cal.
*† Robinson, H., Jacksonville, Fla.
* Runyon, E. W., San Francisco.
* Ruppert, John, Cincinnati, O.
* Schmidt, Val., San Francisco, Cal.
*† Schuh, P. G., Cairo, Ill.
* Searby, W. M., San Francisco.
* Simmon, Karl, St. Paul, Minn.
Smith, R. B., Lawrence, Mass.
Smith, W. C., Oakland, Cal.
* Steele, Jas. G., San Francisco.
* Stein, Jac. H., Reading, Pa.
Stevens, A. B., Ann Arbor, Mich.
Tiernan, F. M., Roselle, N. J.
Topley, Jas., Vallejo, Cal.
* Uhlich, F. G., St. Louis, Mo.
Weck, C. E., Pasadena, Cal.
Welch, W. C., San Francisco, Cal.
* Wenzell, W. T., San Francisco, Cal.
* Weschcke, C., New Ulm, Minn.
* Whelpley, H. M., St. Louis, Mo.
White, R. E., San Francisco, Cal.
Whitney, H. M., Lawrence, Mass.
* Wilcox, Fred., Waterbury, Conn.
Wilkins, Frank M., Eugene, Ore.
Winter, Jonas, Hagerstown, Md.
* Youngs, Wm., Rich Hill, Mo.
Zeilin, J. H., Philadelphia.

ENTERTAINMENTS.

The journey to and from San Francisco and the entertainments were of the most enjoyable nature, and will long be remembered by those who were present. As previously announced, two excursion parties from the East had been arranged for, one starting from St. Louis by way of Kansas City and through Kansas, reaching Denver Sunday morning, June 16. The other party left Chicago somewhat later than contemplated, and passing through Iowa and Nebraska, arrived at Denver on Sunday afternoon. The druggists of Denver and of adjacent parts of Colorado met the visitors on Sunday evening at the St. James Hotel, where an informal reception was held, and conducted them afterward to Trinity Methodist Church, where a recital on the grand organ was given for their entertainment. On Monday a complimentary excursion was tendered to the visitors up Clear Creek Cañon to Silver Plume, and was thoroughly enjoyed by all.

On Tuesday the two excursion parties separated again, one going by way of Cheyenne and Ogden directly to Salt Lake City, and after spending there a couple of days, to San Francisco. The other party tarried until Thursday morning at Manitou and Colorado Springs, visiting the different springs, falls, cañons and caves. Immediately after arrival at "The Mansions" at Manitou, a meeting was held, Mr. Painter presiding and Mr. Kennedy acting as Secretary. A committee consisting of Messrs. Whitney, Main and Kennedy was appointed to draft resolutions of thanks to the Denver Pharmaceutical Association for the unbounded hospitality and unremitting kindness extended to the visitors. On motion of Mr. Manning, contributions were received from the visiting members present, for the purpose of presenting some testimonial to Mr. E. L. Scholtz, the Secretary of the Denver Association. Mr. Scholtz urgently requested, in case a token be procured, that it be presented to the Denver Pharmaceutical Association, all of whose members had united to make the stay of the visitors as pleasant as possible. A committee consisting of Messrs. Kennedy, Druehl and Bedford was appointed to carry out the views of the party.

The subsequent journey was over the picturesque Denver and Rio Grande road, through the Royal Gorge of the Arkansas, over Marshall pass (10,850 feet altitude), the cañon of the Gunnison, the plains of Western Colorado and the desert of Eastern Utah to Salt Lake, thence westward through Nevada, crossing the Sierra Nevada, to San Francisco.

The entertainments planned at the place of meeting by the druggists of San Francisco and of the Pacific Coast, commenced on Monday evening, June 24, with a grand reception and promenade concert at the Palace Hotel, which was the head quarters of the Association during the week. The parlor floor of this mammoth structure was especially reserved for this occasion.

On Tuesday afternoon the resident ladies met in the reception parlors of the Pacific Hotel to act as escorts to the visiting ladies to the Panorama of the Battle of Vicksburg and through Chinatown. Wednesday morning was again set aside for the enjoyment of the ladies; the route of the carriage drive was through the U. S. Reservation and Presidio, and through Golden Gate Park to the Cliff House, where the famous Seal Rocks were viewed, the return trip being through the park. Thursday morning Sutro Heights were visited, via the scenic route of the Park and Ocean Railroad, a magnificent view being afforded of the Pacific Ocean.

A banquet was given at the Palace Hotel on Wednesday evening, the hall and the tables being elegantly decorated. Dr. S. H. Melvin, president of the California College of Pharmacy, presided. A number of toasts were proposed and responded to, and a surprise was in store for the hosts when President Alexander presented to the College, on behalf of Prof. Runyon, a well executed portrait of Emlen Painter, formerly one of the professors of the College, and now a visitor to the city and the president-elect of the National Association. The evening's entertainment closed with dancing in the parlors of the hotel and promenading in the corridors.

Thursday evening was devoted to a visit to Chinatown. Theatres, bazaars, restaurants, private houses, etc., were inspected under the guidance of trusted and experienced leaders.

After adjournment, on Friday afternoon, a visit was paid to Oakland, where the local druggists took charge of the visitors, and showed them the city and its surroundings. Lake Merritt, Pleasant Valley, the Sulphur Springs, and many other places of interest were visited, the day closing with a banquet at Tubbs Hotel, where brief speeches were made by a number of members previous to final adjournment.

Saturday morning closed the week's entertainments with an excursion around the Bay of San Francisco, on board the steamer James M. Donohue. The route was around Alcatrez Island to the Presidio, Fort Point, the Golden Gate, Saucelito, Raccoon Straits, Red Rock, and past Oakland, Alameda and Hunter's Point. Shortly after two o'clock the landing was effected, and after bidding their hosts good-bye the visitors returned to the hotel, and a large number of them took the afternoon train for San José and for the Hotel del Monte, on the Bay of Monterey, where the Sunday was spent. The stately palms and cacti, the large live oaks and coniferous trees, the ancient town of Monterey with its

relics, the drive along the beaches, through Cypress Grove, etc., formed novel attractions for the visitors.

Monday, July 1st, was the day which found most of the visiting members engaged in making preparations for leaving hospitable San Francisco. A party of about fifteen made the journey to the famous Yosemite Valley with its towering rocks and grand waterfalls, took a look at the peaks of the Lyell group of the Sierra, and paid a visit to the big trees (*Sequoia gigantea*) in the Mariposa grove, where the famous "grizzly giant," the "wawona" (through which the stage passes), and many other forest giants have their home. Most of the members on their homeward journey went northward, passing Mount Shasta and through Willamette valley, to Portland, Ore., and Tacoma, Wash. Excursions were made up the Columbia river, and on Puget Sound to Seattle and Victoria; and on the line of the Northern Pacific Railroad some stopped at Spokane Falls, Helena and other places, and then visited the Yellowstone National Park, with its numerous hot springs, active geysers, and grand waterfalls, and the magnificent and picturesque grand cañon.

Most of the eastern members stopped for a day or two in Minneapolis, St. Paul and Chicago, and then returned to their homes, some having journeyed over 8,800 miles by railroad and about 300 miles by stage. It was a memorable trip for each one. Aside from the works erected by human hands, the varied scenery, the changes in climate, the strange flora, the native forests, the groves of tropical trees planted for timber or fruit, the extensive deserts, the broad and fertile valleys, the wild cañons, the snow-capped mountains and the natural wonders of Yosemite and of Yellowstone Park, made impressions which can never be effaced from memory.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE THIRTY-SEVENTH ANNUAL MEETING, WITH THE ADDRESSES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

Colleges.	*Presidents.*	*Secretaries.*
California	S. H. Melvin, East Oakland	F. A. Beckett, San Francisco.
Chicago	George Buck	D. H. Galloway.
Cincinnati	A. W. Bain	C. T. P. Fennel.
Illinois (Chicago)		T. H. Patterson.
Louisville	J. W. Fowler	Fred. C. Miller.
Maryland (Baltimore)	Edwin Eareckson	John W. Geiger.
Massachusetts (Boston)	Henry Canning	C. C. Williams.
National (Washington)	H. E. Kalusowski	Chas. Becker.
New York	Ewen McIntyre	J. N. Hegeman.
Philadelphia	Chas. Bullock	Wm. B. Thompson.
St. Louis	F. W. Sennewald	Chas. Gietner.

STATE PHARMACEUTICAL ASSOCIATIONS.

	Presidents.	*Secretaries.*
Alabama	G. W. Bains, Birmingham	P. C. Candidus, Mobile.
Arkansas	W. W. Kerr, Batesville	J. W. Beidelman, Little Rock.
California	S. H. Melvin, East Oakland	F. A. Beckett, San Francisco.
Connecticut	Dwight G. Stoughton, Hartford	Frederick Wilcox, Waterbury.
Florida	H. C. Cushman, Pensacola	S. P. Watson, Jacksonville.
Georgia	Wm. S. Parks, Atlanta	H. R. Slack, Jr., La Grange.
Illinois	Henry Smith, Decatur	L. C. Hogan, Englewood,
Indiana	Albert Allen, Greencastle	Jos. R. Perry, Indianapolis.
Iowa	W. H. Torbert, Dubuque	Rosa Upson, Marshalltown.
Kansas	P. P. Allen, Wichita	John T. Moore, Lawrence.
Kentucky	Edward C. Pfingst, Louisville	J. W. Gayle, Frankfort.
Louisiana	F. M. Brooks, Baton Rouge	L. F. Chalin, New Orleans.
Massachusetts	B. F. Stacey, Charlestown	J. W. Colcord, Lynn.
Minnesota	E. F. Allen, Minneapolis	Karl Simmon, St. Paul.
Missouri	J. M. Good, St. Louis	G. H. C. Klie, St. Louis.
Nebraska	Chas. F. Goodman, Omaha	Chas. J. Daubach, Lincoln.
New Hampshire	Geo. F. Underhill, Concord	C. B. Spofford, Claremont.
New Jersey	H. P. Thorn, Medford	Chas. F. Dare, Bridgeton.
North Carolina	J. D. Croom, Maxton	E. V. Zoeller, Tarboro.
Ohio	L. W. Sherwood, Columbus	Lewis C. Hopp, Cleveland.

	Presidents.	Secretaries.
Pennsylvania	John W. Miller, Allegheny	J. A. Miller, Harrisburg.
Rhode Island	Frank A. Jackson, Woonsocket	Wm. E. Cates, Providence.
South Dakota	W. S. Branch, Parker	I. A. Keith, Lake Preston.
Virginia	E. A. Craighill, Lynchburg	C. B. Fleet, Lynchburg.
Wisconsin	J. C. Huber, Fond du Lac	E. B. Heimstreet, Janesville.

LOCAL ASSOCIATIONS.

	Presidents.	Secretaries.
Dauphin Co., Pa.	John W. Hay, Harrisburg	J. A. Miller, Harrisburg.
Detroit, Mich	Jas. W. Caldwell	B. M. Patterson.
St. Louis Microscopists	H. M. Whelpley	F. Davis, Belleville, Ill.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

	Presidents.	Secretaries.
California	F. A. Beckett, San Francisco	J. G. Munson, San José.
Chicago	Geo. R. Baker	J. T. Delfosse.
Cincinnati	Julius Eichberg	Victor C. Muehlberg.
Philadelphia	B. Frank Scholl	Wm. E. Krewson.
St. Louis	W. C. Bolm	H. M. Whelpley.

LIST OF PUBLICATIONS RECEIVED

FOR THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,
143 North Tenth Street, Philadelphia.

☞ Proceedings of State Pharmaceutical Associations should be sent to the REPORTER ON THE PROGRESS OF PHARMACY, C. LEWIS DIEHL, Louisville, Ky.

American Druggist, New York, 1889.
American Pharmacist, Detroit, 1889.
Deutsch-Amerikanische Apotheker Zeitung, New York, 1889.
Pharmaceutical Record, 1889.
Pharmaceutische Rundschau, 1889.
The Druggists' Circular, 1889.
Annual Report of the State Librarian of New Jersey, 1888.
Annual Report of the Trustees of the New York State Library, 1888.
Reports (100, 101, 102) of the Regents of the University of the State of New York.
American Journal of Medical Sciences, Philadelphia, 1889.
American Journal of Pharmacy, Philadelphia, 1889.
Transactions of the College of Physicians, 3d Series, X.
The Western Druggist, Chicago, 1889.
The National Druggist, St. Louis, 1889.
Transactions of the Michigan State Medical Society, 1889.
Transactions of the South Carolina Medical Association, 1889.
12 Theses; École Supérieure de Pharmacie de Paris.
Bolletino delle Pubblicazioni Italiane ricevute per diritto di stampa.
Victoria Pharmaceutical Register for 1888.
The Canadian Pharmaceutical Journal, Toronto, 1889.
Pharmaceutical Journal and Transactions, London, 1889.
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1888.
Calendar of the Pharmaceutical Society of Great Britain, 1889.
The Chemist and Druggist, London, 1889.
The Chemists' and Druggists' Diary, 1889, 1890.
Calendar of the Pharmaceutical Society of Ireland, 1889.
Proceedings of the Philosophical Society of Glasgow, 1887–88 vol. xix.
Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereins. Wien, 1889.
Anzeiger der K. K. Akademie der Wissenschaften. Wien, 1889.
Nachrichten von der K. Gesellschaft der Wissenschaften zu Göttingen, 1888.
Sitzungsberichte der K. B. Akademie der Wissenschaften, 1887, II, III, 1888, I, II.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS,

TO WHOM COMPLIMENTARY COPIES OF THE PROCEEDINGS OF THIS ASSOCIATION ARE FORWARDED.

The State Libraries of all the States of the Union except Connecticut. (At the request of the State Librarian of Connecticut, a copy of the Proceedings is sent to Trinity College, Hartford, Conn.)

Alabama.—Alabama Pharmaceutical Association, P. C. Candidus, Secretary, Mobile.
" State Library of Alabama, Montgomery.

Arkansas.—Arkansas Association of Pharmacists, J. W. Beidelman, Secretary, Little Rock.
" State Library of Arkansas, Little Rock.

California—California College of Pharmacy, San Francisco.
" State Library of California, Sacramento.

Colorado.—State Library of Colorado, Denver.

Connecticut.—Connecticut Pharmaceutical Association, F. Wilcox, Secretary, Waterbury.
" Medical Journal and Library Association, Hartford.
" Trinity College, Hartford.
" Silas Bronson Library, Waterbury.
" Yale College, New Haven.

Delaware.—Delaware Pharmaceutical Association, J. M. Harvey, Secretary, Wilmington.
" State Library of Delaware, Dover.

District of Columbia.—National College of Pharmacy, Washington.
" Bureau of Education, Washington.
" Congressional Library, Washington.
" Department of Agriculture, Washington.
" Library of the American Medical Association, Washington.
" Smithsonian Institution, Washington.
" Surgeon-General United States Army, Washington.
" Surgeon-General United States Marine Hospital Service, Washington.
" Surgeon-General United States Navy, Washington.
" United States Patent Office, Washington.

Florida.—Florida State Pharmaceutical Association, J. P. Watson, Secretary, Jacksonville.
" State Library of Florida, Tallahassee.

Georgia.—Georgia Pharmaceutical Association, H. R. Slack, Jr., Secretary, La Grange.
" State Library of Georgia, Atlanta.

Illinois.—Illinois Pharmaceutical Association, L. C. Hogan, Secretary, Englewood.
" Chicago College of Pharmacy, Chicago.
" Illinois College of Pharmacy, Chicago.
" The Western Druggist, Chicago.
" State Library of Illinois, Springfield.

Indiana.—Indiana Pharmaceutical Association, J. R. Perry, Secretary, Indianapolis.
" Purdue University, Lafayette.
" State Library of Indiana, Indianapolis.
Iowa.—Iowa State Pharmaceutical Association, Rosa Upson, Secretary, Marshalltown.
" State Library of Iowa, Des Moines.
Kansas.—Kansas Pharmaceutical Association, J. T. Moore, Secretary, Lawrence.
" Kansas State University, Lawrence.
" State Library of Kansas, Topeka.
Kentucky.—Kentucky Pharmaceutical Association, J. W. Gayle, Secretary, Frankfort.
" Louisville College of Pharmacy, Louisville.
" State Library of Kentucky, Frankfort.
Louisiana.—Louisiana State Pharmaceutical Association, L. F. Chalin, Secretary, New Orleans.
" State Library of Louisiana, Baton Rouge.
Maine.—Maine Insane Asylum, Augusta.
" Bowdoin College, Brunswick.
" State Library of Maine, Augusta.
Maryland.—Maryland Pharmaceutical Association, M. L. Byers, Secretary, Hagerstown.
" Maryland College of Pharmacy, Baltimore.
" Maryland Academy of Sciences, Baltimore.
" Medical and Chirurgical Faculty of Maryland, Dr. G. L. Taneyhill, Secretary, Baltimore.
" University of Maryland, Baltimore.
" State Library of Maryland, Annapolis.
Massachusetts.—Massachusetts State Pharmaceutical Association, J. W. Colcord, Secretary, Lynn.
" Amherst College, Amherst.
" American Academy of Arts and Sciences, Boston.
" Boston Athenæum, Boston.
" City Library, Boston.
" City Hospital, Boston.
" Harvard University, Cambridge.
" Massachusetts College of Pharmacy, Boston.
" Massachusetts General Hospital, Boston.
" Medical Library Association, Boston.
" State Library of Massachusetts, Boston.
Michigan.—Michigan State Pharmaceutical Association, S. E. Parkill, Secretary, Owosso.
" Michigan State Medical Society, Dr. G. Duffield, Detroit.
" American Pharmacist, Detroit.
" The Pharmaceutical Era, Detroit.
" University of Michigan, Ann Arbor.
" State Library of Michigan, Lansing.
Minnesota.—Minnesota State Pharmaceutical Association, K. Simmon, Secretary, St. Paul.
" State Library of Minnesota, St. Paul.
Mississippi.—Mississippi State Pharmaceutical Association, H. F. West, Secretary, Fayette.
" State Library of Mississippi, Jackson.
Missouri.—Missouri State Pharmaceutical Association, G. H. C. Klie, Secretary, St. Louis.
" Academy of Science of St. Louis, St. Louis.

Missouri.—National Druggist, St. Louis.
" The Druggist, St. Louis.
" St. Louis College of Pharmacy, St. Louis.
" St. Louis Mercantile Library, St. Louis.
" St. Louis Public School Library, St. Louis.
" State Library of Missouri, Jefferson City.

Montana.—State Library of Montana, Helena.

Nebraska.—Nebraska State Pharmaceutical Association, C. J. Daubach, Secretary, Lincoln.
" State Library of Nebraska, Lincoln.

Nevada.—State Library of Nevada, Carson City.

New Hampshire.—New Hampshire Pharmaceutical Association, C. B. Spofford, Secretary, Claremont.
" Dartmouth College, Hanover.
" State Library of New Hampshire, Concord.

New Jersey.—New Jersey Pharmaceutical Association, C. F. Dare, Secretary, Bridgeton.
" New Jersey State Lunatic Asylum, Trenton.
" State Library of New Jersey, Trenton.

New York.—New York State Pharmaceutical Association, C. W. Holmes, Secretary, Elmira.
" Albany College of Pharmacy, Albany.
" Cornell University Library, Ithaca.
" American Druggist, New York.
" Astor Library, New York.
" College of Pharmacy of the City of New York, New York.
" Deutsch-Amerikanische Apotheker Zeitung, New York.
" Druggists' Circular, New York.
" Literary and Scientific Society of German Apothecaries, New York.
" Mercantile Library, New York.
" New York Academy of Medicine, 12 West 31st Street, New York.
" Pharmaceutical Record, New York.
" Pharmaceutische Rundschau, New York.
" Long Island Historical Society, Brooklyn.
" State Library of New York, Albany.

North Carolina.—North Carolina Pharmaceutical Association, E. V. Zoeller, Secretary, Tarboro.
" State Library of North Carolina, Raleigh.

North Dakota.—North Dakota Pharmaceutical Association, H. L. Haussamen, Secretary, Grafton.
" State Library of North Dakota, Bismarck.

Ohio.—Ohio State Pharmaceutical Association, L. C. Hopp, Secretary, Cleveland.
" Cincinnati Academy of Medicine, Cincinnati.
" Cincinnati College of Pharmacy, Cincinnati.
" Mussey Medical Library, Cincinnati.
" Cincinnati Hospital Library, Cincinnati.
" Longview Asylum, Carthage, Hamilton county.
" State Library of Ohio, Columbus.

Oregon.—State Library of Oregon, Salem.

Pennsylvania.—Pennsylvania Pharmaceutical Association, J. A. Miller, Secretary, Harrisburg.
" Academy of Natural Sciences, Philadelphia.

Pennsylvania.—American Journal of Medical Sciences, Philadelphia.
" American Journal of Pharmacy, Philadelphia.
" American Philosophical Society, Philadelphia.
" College of Physicians, Philadelphia.
" Franklin Institute, Philadelphia.
" Mercantile Library, Philadelphia.
" Pennsylvania Hospital, Philadelphia.
" Philadelphia College of Pharmacy, Philadelphia.
" Philadelphia Library, Philadelphia.
" Pittsburgh College of Pharmacy, Pittsburgh.
" State Library of Pennsylvania, Harrisburg.
Rhode Island.—Rhode Island Pharmaceutical Association, W. E. Cates, Secretary, Providence.
" State Library of Rhode Island, Providence.
South Carolina.—South Carolina Pharmaceutical Association, ——— Secretary.
" South Carolina Medical Association, Dr. J. L. Dawson, Secretary, Charleston.
" State Library of South Carolina, Columbia.
South Dakota.—South Dakota Pharmaceutical Association, I. A. Keith, Lake Preston.
" State Library of South Dakota, Pierre.
Tennessee.—Tennessee Druggists' Association, J. L. Thompson, Secretary, Nashville.
" State Library of Tennessee, Nashville.
Texas.—Texas State Pharmaceutical Association, E. D. Oesch, Secretary, Fort Worth.
" State Library of Texas, Austin.
Vermont.—University of Vermont, Burlington.
" State Library of Vermont, Montpelier.
Virginia.—Virginia Pharmaceutical Association, C. B. Fleet, Secretary, Lynchburg.
" State Library of Virginia, Richmond.
Washington.—State Library of Washington, Olympia.
West Virginia.—West Virginia Pharmaceutical Association, C. Menkemeller, Secretary, Wheeling.
" State Library of West Virginia, Charleston.
Wisconsin.—Wisconsin Pharmaceutical Association, E. B. Heimstreet, Secretary, Janesville.
" University of Wisconsin, Madison.
" State Library of Wisconsin, Madison.
Canada.—Halifax Pharmaceutical Society, Nova Scotia.
" Ontario College of Pharmacy, Toronto.
" Pharmaceutical Association of the Province of Quebec, E. Muir, Secretary, Montreal.
Mexico.—Escuela de Farmacia, Mexico.
Argentine Republic.—Sociedad de Farmacia Argentina, Buenos Ayres.
Austria.—Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereines, Wien.
" K. K. Gesellschaft der Aerzte, Wien.
" K. Akademie der Wissenschaften, Wien.
Belgium.—Académie Royale de Médecine de Belgique, Bruxelles.
" Société de Pharmacie Royale de Bruxelles.
" Société Royale des Sciences Médicales et Naturelles, Bruxelles.
" Société de Pharmacie d'Anvers.
Denmark.—Archiv for Pharmacie, S. M. Trier, Kjobenhavn.
" Denmark's Apotheker Forening, Gust Lotze, President, Odense.

France.—Bibliothèque de l' École supérieure de Pharmacie, Paris.
Germany.—Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.
" K. Akademie der Wissenschaften, Göttingen.
" K. Bayer. Akademie der Wissenschaften, München.
" K. Bibliothek der Universität Strassburg.
" Pharmaceutisches Institut, Universität Erlangen.
Great Britain.—British Pharmaceutical Conference, 17 Bloomsbury Square, London.
" Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London.
" Pharmaceutical Journal and Transactions, 17 Bloomsbury Square, London.
" Chemical News, Boy Court, Ludgate Hill, London, E. C.
" Chemist and Druggist, 44 Cannon Street, London.
" British Museum, London.
" Association of Chemists and Druggists, Wolverhampton.
" Coventry and Warwickshire Pharmaceutical Association, Coventry.
" Liverpool Chemists' Association, Liverpool.
" Pharmaceutical Society at Edinburgh, 36 York Place.
" Pharmaceutical Society of Ireland, Dublin.
" Philosophical Society, Glasgow.
Italy.—R. Biblioteca Nazionale, Firenze.
" Archivio di Farmazia, Roma.
Netherlands.—Nederlandsche Maatschappij ter bevordering der Pharmacie, Jacobus Polak, Secretary, Amsterdam.
Norway.—Kongelige Norske Universitet i Christiani.
Russia.—Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.
" Pharmaceutisches Institut, Dorpat, Russia.
Sweden.—Pharmaceutical Institution, Stockholm, Sweden.
Switzerland.—Schweizerische Wochenschrift für Pharmacie, A. Klunge, Aubonne.
Australia.—Pharmaceutical Society of Victoria, Melbourne.
" Australasian Journal of Pharmacy, Melbourne.
" Pharmaceutical Society of New South Wales, Sydney.
" Pharmaceutical Society of New Zealand, Auckland.

GENERAL INCORPORATION LAW FOR THE DISTRICT OF COLUMBIA.

SECTIONS APPLICABLE TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

CLASS 3, SOCIETIES, BENEVOLENT, EDUCATIONAL, ETC.

SEC. 545. Any three or more persons of full age, citizens of the United States, a majority of whom shall be citizens of the District, who desire to associate themselves for benevolent, charitable, educational, literary, musical, scientific, religious, or missionary purposes, including societies formed for mutual improvement, or for the promotion of the arts, may make, sign, and acknowledge before any officer authorized to take acknowledgment of deeds in the District, and file in the office of the Recorder of Deeds, to be recorded by him, a certificate in writing, in which shall be stated:

First. The name or title by which such society shall be known in law.

Second. The term for which it is organized, not exceeding twenty years.

Third. The particular business and objects of the society.

Fourth. The number of its trustees, directors, or managers for the first year of its existence.

SEC. 546. Upon filing their certificate, the persons who shall have signed and acknowledged the same, and their associates and successors, shall be a body politic and corporate, by the name stated in such certificate; and by that name they and their successors may have and use a common seal, and may alter and change the same at pleasure, and may make by-laws and elect officers and agents; and may take, receive, hold and convey real and personal estate necessary for the purposes of the society as stated in their certificate.

SEC. 547. Such incorporated society may annually, or oftener, elect from its members its trustees, directors, or managers, at such time and place, and in such manner as may be specified in its by-laws, who shall have the control and management of the affairs and funds of the society, and a majority of whom shall be a quorum for the transaction of business, and whenever any vacancy shall happen among such trustees, directors, or managers, the vacancy shall be filled in such manner as shall be provided by the by-laws of the society.

SEC. 548. The trustees, directors, or stockholders of any existing benevolent, charitable, educational, musical, literary, scientific, religious, or missionary corporation, including societies formed for mutual improvement, may, by conforming to the requirements herein, re-incorporate themselves, or continue their existing corporate powers under this chapter, or may change their name, stating in their certificate the original name of such corporation as well as their new name assumed: and all the property and effects of such existing corporation shall vest in and belong to the corporation so re-incorporated or continued.

SEC. 549. Such corporations may sell and dispose of any real estate they may acquire by purchase, gift, or devise, as follows; whenever any lot purchased for the use of the corporation, or any building erected thereon, shall become ineligible for the uses for which the lot was purchased or the building erected, to be determined by a vote of two-thirds of the shares of the stock of the corporation or the members of the corporation, at a meeting of the stockholders, or corporators, or members specially called for that

purpose, the proceedings of which meeting shall be duly entered in the records of the corporation, said lot or building may be sold, and the proceeds thereof may be vested in another lot, or in the erection of another building, or both.

SEC. 550. When any real estate shall have been devised or given to any such corporation for any specified benevolent purpose, and where, by a vote of three-fourths of the stock held by the stockholders, or three-fourths of the corporators, if no shares of stock have been created, at a meeting called for the purpose, of which such stockholders or corporators or members shall have at least ten days' notice, the corporation shall determine to surrender their corporate powers and cease to act under the same, said real and personal estate so acquired shall be sold at public auction, proper notice of the time and place of sale having been given, and the proceeds of the sale equitably distributed among the stockholders or corporators, or disposed of for the promotion and advancement of the objects for which such corporation was originally organized.

SEC. 551. No corporation acting under the six preceding sections shall hold real estate more than five years, except so much as shall be necessary for the purposes named in its certificate.

SEC. 552. The provisions of this chapter shall not extend or apply to any association or individual who shall, in the certificate filed with the Recorder of Deeds, use or specify a name or style the same as that of any previously existing incorporated body in the District.

Approved 5 May, 1870, c. 80, v. 16, pp. 98–116—Revised Statutes of the United States relating to the District of Columbia.

CERTIFICATE OF INCORPORATION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Whereas, We, the undersigned, desire to form an association having for its object to unite the educated and reputable Pharmacists and Druggists of America, as will more fully hereinafter appear;

Now, therefore, we do hereby certify as follows:

First, The corporate name of the association is the American Pharmaceutical Association.

Second, This association shall continue until dissolved by the action of its members, or by the operation of law.

Third, The objects and business of said association are as follows:

a. To improve and regulate the drug market, by preventing the importation of inferior, adulterated or deteriorated drugs, and by detecting and exposing home adulterations.

b. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

c. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and in encouraging home production and manufacture in the several departments of the drug business.

d. To regulate the system of apprenticeship and employment, so as to prevent, so far as possible, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

e. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

f. To uphold standards of authority in the education, theory and practice of Pharmacy.

g. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and the greatest protection to the public.

Fourth. The concerns and affairs of the Association shall be managed by a Council, which shall consist for the first year of John U. Lloyd, Maurice W. Alexander, Alexander K. Finlay, Karl Simmon, Samuel A. D. Sheppard, John M. Maisch, James Vernor, C. Lewis Diehl, William H. Rogers, William Saunders, Albert E. Ebert, Philip C. Candidus, George W. Kennedy, Albert H. Hollister, James M. Good, Lewis C. Hopp and William Dupont.

Given under our respective hands and seals this 12th day of December, A. D. 1887.

Signed:	JOHN U. LLOYD,	MAURICE W. ALEXANDER,
	ALEX. K. FINLAY,	KARL SIMMON.
	SAMUEL A. D. SHEPPARD,	JOHN M. MAISCH,
	JAMES VERNOR,	C. LEWIS DIEHL,
	WILLIAM H. ROGERS,	WM. SAUNDERS,
	ALBERT E. EBERT,	PHILIP C. CANDIDUS,
	GEO. W. KENNEDY,	ALBERT H. HOLLISTER,
	JAMES M. GOOD,	LEWIS C. HOPP,
		WILLIAM DUPONT,
Members of the Council,		
And	JOHN A. MILBURN,	G. G. C. SIMMS,
	E. B. BURY,	Z. W. CROMWELL,
	W. S. THOMPSON,	JOHN R. MAJOR,
	CHARLES CHRISTIANI,	W. G. DUCKETT,
	A. J. SCHAFHIRT,	GEO. W. BOYD,
	O. H. COUMBE,	HENRY A. JOHNSTON,
	GEO. B. LOCKHART,	W. C. MILBURN,
	T. C. MURRAY,	ARTHUR NATTANS,
	JOSEPH R. WALTON,	THOMAS M. WEHRLY,

of the District of Columbia.

(Notaries' certificates attached to the original document attest the genuineness of each and every signature.)

Received for Record February 21st, 1888, at 1:05 P. M., and recorded in Liber No. 4, fol. 302, Acts of Incorporation, District of Columbia, and examined.

Signed: JAS. M. TROTTER, *Recorder*.

SEAL:
Office of Recorder of Deeds,
District of Columbia,
Washington, D. C.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects;

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmacists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted

in writing, and may be balloted for at the next Annual Meeting, when upon receiving the votes of three fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the President and Vice Presidents.

ARTICLE I. The President shall preside at all meetings of the Association, except those of the special Sections, as hereinafter provided. In his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore*, shall perform the duties of President.

ARTICLE II. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE III. In meetings, the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

ARTICLE IV. In all ballotings, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division, the motion is lost.

ARTICLE V. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in cases of personality or impropriety, he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VI. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-laws are properly enforced.

ARTICLE VII. He shall appoint all committees, unless provided for in the By-laws, or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and countersign all orders on the Treasury. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of $750, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE II. He shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each annual meeting.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall be elected annually, near the close of the annual meeting, and shall reside at or near the place where the next annual meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties; shall co-operate with the Council and any Local Committee in making arrangements for the annual meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

ARTICLE III. An exhibition of objects interesting to pharmacists shall be held each year, under the direction of the Local Secretary and the Committee on Commercial Interests.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each annual meeting, the names of such members as have failed to pay their annual contributions for three years.

ARTICLE IV. He shall present a statement of his accounts at each annual meeting of

the Council, that they may be audited; he shall receive an annual salary of $600, and the amount of his expenses incident to the meeting, in addition to his salary.

ARTICLE V. The Treasurer, in order that he may qualify for the office to which he has been elected, shall file a good and sufficient bond or bonds to the amount of $10,000 with the Chairman of the Council for the faithful performance of his duties as Treasurer, this bond or bonds to be signed and executed by two sureties or Trust Company acceptable to the Council.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services an annual sum of $750.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry, and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical, biographical, and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented completed at the annual meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association. Any member of the Association may attend the meetings of the Council, and may, by a special vote of the Council, be invited to speak on any subject under discussion.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent annual meeting, three members shall be elected to take the places of those whose terms will

then expire, to serve for the term of three years. No elected member of the Council, after having served one term, shall be eligible for re-election to the Council to serve the next succeeding term.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council. The Secretary may or may not be a member of the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association from one annual meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the annual meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section* 1. The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at each of its sessions the names of those candidates for membership which have been proposed, when a vote of two-thirds shall be sufficient to recommend them to the Association.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing, with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be voted on by the Association without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears, one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and Committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be six standing committees: A Committee on Commercial Interests, and on the Revision of the U. S. Pharmacopœia, each to consist of five members; a Committee on Scientific Papers, a Committee on Prize Essays, a Committee on Legislation, and a Committee on Pharmaceutical Education, each to consist of three members.

ARTICLE II. The Committee on Commercial Interests shall be appointed by the Section on Commercial Interests. They shall be charged with the work of arranging in advance the business to come before the Section at the next annual meeting. They shall propose each year a subject for discussion at the meetings of the State Associations, and at the following annual meeting of this Association they shall present a report of the action of the State Associations upon the subject proposed.

ARTICLE III. The Committee on Scientific Papers shall be appointed by the Section on Scientific Papers. They shall arrange the business of the Section, and shall report, near the close of each annual meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same, with a synopsis of its contents, to the Committee on Scientific Papers previous to the first session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Scientific Papers before the first annual session of the Association.

ARTICLE VI. The Committee on Prize Essays, which shall be appointed by the Chairman of the Section on Scientific Papers, shall, within six months after the annual meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the Committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on Legislation, which shall be elected by the Section on Legislation, shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of Pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year. They shall arrange the business of the Section in advance of its meetings, and propose suitable subjects for discussion.

ARTICLE VIII. The Committee on Revision of the United States Pharmacopœia shall be appointed by the President of the Association. It shall be their duty to collect and codify such facts as may serve as a basis of the report to be presented by this Association to the National Convention for revising the Pharmacopœia. It shall collect statistics regarding the frequency with which officinal and non-officinal remedies are used in legitimate practice, and shall endeavor to ascertain the general wishes and feelings of

the profession throughout the country in regard to any desired changes or improvements in the Pharmacopœia.

ARTICLE IX. The Committee on Pharmaceutical Education shall be appointed by the Section on Pharmaceutical Education, and it shall be their duty to arrange the business of the Section in advance of its meetings, to propose suitable subjects for discussion, and to attend to such duties of the Section as may be delegated to them.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every Pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be especially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association and the obligations of the Constitution and By-laws, are willing to subscribe to them, are eligible to membership.

ARTICLE II. Any two members of the Association may propose to the Council the name of any person eligible to membership, and if approved, the Council shall recommend the person named to the Association, and if the Association shall by vote invite said person to become a member, his membership shall be completed by his signing the Constitution and By-laws, and paying the annual contribution for the current year.

ARTICLE III. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years.*

ARTICLE IV. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of $75 during the first year of his connection therewith, or after five years $70, or after ten years $60, or after fifteen years $50, or after twenty years $40, or after twenty-five years $30, or after thirty years $20, or after thirty-five years $10, shall become a life member, and shall be exempt from all future annual contributions.

ARTICLE V. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the annual meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year: Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name shall have been dropped from the roll for non-payment of dues; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the annual meeting.

ARTICLE VI. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer.

ARTICLE VII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-laws.

ARTICLE VIII. Resignations of membership shall be made in writing to the Perma-

nent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE IX. Any member may be expelled for improper conduct, or the violation of the Constitution, By-laws, or Ethics, adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE X. Pharmacists, chemists, and other scientific men who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office or vote at the meetings.

CHAPTER IX.

Of Meetings and Sections.

ARTICLE I. The meetings shall be held annually: Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President, or one of the Vice-Presidents, with the advice and consent of the Council.

ARTICLE II. To expedite and render more efficient the work of the Association, four Sections shall be formed, as follows: 1. Scientific Papers; 2. Commercial Interests; 3. Pharmaceutical Education; 4. Legislation.

ARTICLE III. The business of the Association shall be arranged so that the labors of each Section shall be considered only at the session or sessions to which they are especially assigned.

ARTICLE IV. The first, second and last sessions of the annual meeting shall be devoted to the general business of the Association, and sufficient time shall be assigned to the Association at the beginning of all other sessions to read its minutes and act on the report of Council on membership.

ARTICLE V. At the third and fourth sessions the business of the Section on Commercial Interests shall be considered.

ARTICLE VI. The fifth, sixth, and seventh sessions shall be devoted to the reading of Scientific Papers and the discussions thereof.

ARTICLE VII. The Sections on Legislation and Pharmaceutical Education shall hold their meetings at the eighth session, either at the same time or one after the other, as may be determined by the Association.

ARTICLE VIII. A Chairman and Secretary shall be elected by ballot by each Section to serve at the special meetings of said Section. And the minutes of each meeting, together with all documents and papers which belong to each Section, must be placed as soon as possible in the hands of the Permanent Secretary for publication or safe keeping.

ARTICLE IX. The Chairman of each Section shall preside at each of its meetings, and shall prepare a short address treating upon the subjects connected with his Section, to be read before the Section at the next annual meeting.

ARTICLE X. There shall be elected by each Section a Committee, of which the Chairman of the Section shall be Chairman, to whom shall be delegated the duty of arranging in advance the business to come before the Section at the next annual meeting; these committees in each case becoming Standing Committees of the Association.

ARTICLE XI. The order of business at the first session of each annual meeting shall be as follows:

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates.

Section 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII., Chapter VI.

Section 6. Reports of Committees shall be presented, read by their titles, the synopsis or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of States represented, requesting each State in turn to appoint two members, the persons so selected to act as a Committee to nominate officers for the Association and members of the Council for the ensuing year; in addition to which he shall appoint five members who are not delegates, to act with the Committee.

Section 8. The minutes of the Council shall be read in full at the annual meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 9. Incidental business may be called up.

ARTICLE XII. The order of business at the second session at each annual meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding session, which may be amended, if necessary, and shall then be approved.

Section 3. The report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the officers nominated shall be balloted for.

Section 4. The Council shall present names recommended for membership.

Section 5. Reports of Standing Committees shall be read.

Section 6. Reports of Special Committees shall be read.

ARTICLE XIII. The order of business for the meetings of the Sections shall be determined by each Section for itself.

ARTICLE XIV. No money shall be appropriated from the Treasury by any of the Sections.

ARTICLE XV. At the last session of the Association the newly-elected officers of the Association shall take their respective places.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER XI.

Miscellaneous.

ARTICLE I. In all such points of order as are not noticed in these By-Laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

SECTION ON SCIENTIFIC PAPERS.

ORDER OF BUSINESS.

FIRST SESSION OF THE SECTION (Fifth of the Association).

1st. The Chairman and Secretary assume their respective places.

2d. Reading of the Chairman's address.

3d. Report of Committees, if there be any to make, and appointment of such new Committees as may appear desirable.

4th. Nominations (but not elections at this sitting) for the new Committee on Scientific Papers. The names of members nominated to be posted in the hall on the adjournment of this session. The election not to take place until after the opening of the next session, when further nominations may also be made if it is deemed desirable.

5th. Reading of Papers and discussions on the subjects brought up.

6th. Adjournment.

SECOND SESSION OF THE SECTION (Sixth of the Association).

1st. Reading of minutes of the previous session.

2d. Election of New Committee on Scientific Papers.

3d. Reports of Committees—Incidental business.

4th. Reading of Papers.

5th. Adjournment.

THIRD SESSION OF THE SECTION (Seventh of the Association).

1st. Reading of Minutes of the previous session.

2d. Reading of Papers.

3d. Installation of New Officers.

4th. Reports of Committees.

5th. New business.

6th. Reading of Minutes.

7th. Final adjournment.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The Officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence or on account of inability from any cause, the Vice-Chairman, or, in the absence of both, a Chairman *pro tempore*, shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council. He shall receive an annual salary of $50.

ARTICLE II. He shall post in a conspicuous place in the meeting room the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose, shall call and record the yeas and nays whenever they are required to be called; he shall notify the Chairman of every special committee of his appointment, giving him a list of his colleagues and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership who have complied with the requirements of the By-Laws of the Association, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

ARTICLE IV. The Secretary of the Committee shall receive an annual salary of $150.

CHAPTER V.

On Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings.

CHAPTER VI.

On Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall annually, at the meetings, and after due notice through the Pharmaceutical journals, receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. After considering these applications, the Committee shall, at as early a date as possible, report to the Council, recommending such grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

On Meetings.

ARTICLE I. The Council shall meet previous to the assembling of the Association and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

ARTICLE IV. The order of business at the first session of the Council shall be as follows:

1. Organization by the election of the Chairman, Vice-Chairman, and Secretary.
2. Election of the Standing Committees of Council, as follows:

a. Committee on Membership, consisting of five members of the Council, the Permanent Secretary, and Treasurer.

b. Committee on Finance, three members.

c. Committee on Publication, five members.

d. Committee on Centennial Fund, three members.

3. Unfinished and deferred business from the meeting of the last Council, or such business as is especially referred to the Council from the Association.
4. The reading of the names of new members as provided in the By-Laws.
5. Reading of reports and appointment of committees.
6. New business.
7. Adjournment—and before the final adjournment, the minutes of the last session shall be read and approved.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the Standing Committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its Committees, and which can be disposed of by a positive or a negative vote, the Chairman of the Council, or the Chairman of the Committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present.

ARTICLE III. Every proposition to alter or amend these By-laws shall be submitted in writing, and may be balloted for at the next session of the Council, when, upon receiving the votes of three-fourths of the members present, it shall become a part of these By-Laws.

FORM OF PROPOSITIONS FOR MEMBERSHIP.

The undersigned members in good standing, being personally acquainted with the following persons eligible to membership in accordance with Chapter VIII. Article I. of the By-Laws, testify to their moral character, their skill as practical druggists and pharmacists, and their professional probity and good standing, and they recommend them for membership in the American Pharmaceutical Association.

NAMES.	ADDRESS.

FORM FOR COMPLETING MEMBERSHIP IN ACCORDANCE WITH CHAPTER VIII. ARTICLE II. OF THE BY-LAWS.

APPROVING of the objects of the American Pharmaceutical Association, and having read its Constitution and By-Laws, I hereby signify my approval of the same, and subscribe to them, and enclose the annual contribution, five dollars, for the current year.

Name in full, ...

Date, ...

Address, ...

....

GENERAL RULES ON FINANCE.

ADOPTED 1883, AMENDED 1885, 1887, 1888.

First, The Treasurer shall deposit all moneys received by him, except those belonging to the various "Funds," with some reliable banking company, where said money may be drawing interest for the benefit of the Association, said banking company to be designated by the Finance Committee, and approved by the Council.

Second, Said money shall be deposited in the name of the American Pharmaceutical Association, and all checks shall be drawn by the Treasurer, and shall be countersigned by the Chairman of the Council.

Third, All bills due by the Association shall be paid by numbered checks on said banking company, the checks, when returned to the Treasurer, to be attached to the several vouchers.

Fourth, The Treasurer shall make a deposit in the bank whenever the money in his hands shall amount to fifty dollars.

Fifth, The Chairman of the Council shall be the custodian of the bonds and saving-bank books, representing the several Funds belonging to the Association; and bonds and bank-books shall be in the name of the Treasurer, and the accounts of the same shall be kept by him; duplicate accounts to be kept by the Chairman of the Council, who shall make an annual report of the same to the Association.

Sixth, There shall be annually appointed, by the Council, an Examining Committee, this Committee to consist of three members residing in or near the same city or town, the chairman to be a member of the Finance Committee.

Seventh, The Treasurer shall balance his books July 1st of each year, and shall make out, previous to the fifteenth day of July following, his annual report for the financial year just closed.

Eighth, The Treasurer having thus balanced his books and made out his report shall forward all his books, accounts, vouchers, etc., with the report, to the Chairman of the Examining Committee, at such time and place in July of each year as said Chairman may direct.

The Chairman of the Council shall forward to the Chairman of the Examining Committee, at the same time and place, the bonds, saving-bank books, and accounts of the same that may be in his hands.

Ninth, Said books, accounts, vouchers, etc., shall be returned to the Treasurer, and said bonds, savings bank books and accounts of the same to the Chairman of the Council, all within two weeks of the date of their reception by the Chairman of the Examining Committee.

Tenth, There shall be a meeting of the Examining Committee in July of each year, and it shall be the duty of said Committee, at such meeting, to carefully examine all the books, accounts, vouchers, funds, etc., etc., received by them; and, previous to the 1st day of August following, to make a report thereon, in writing, to the Chairman of the Council.

Eleventh, The expense of the bond of the Treasurer given by a Trust Company shall be paid for from the Treasury.

Twelfth, The Treasurer shall furnish with his annual report an alphabetical list of the names of the members from whom he has received money for dues and certificates during the financial year, for publication in the Proceedings.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. De Meyer, *Brussels*, 1868.

Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.

Dr. Robert Bentley, *London*, 1872.

Henry B. Brady, *Newcastle-on-Tyne*, 1871.

Michael Carteighe, *London*, 1882.

Thomas Greenish, *London*, 1882.

Joseph Ince, *London*, 1882.

Dr. J. Redwood, *London*, 1871.

Richard Reynolds, *Leeds*, 1882.

George W. Sandford, *London*, 1882.

Geo. F. Schacht, *Clifton*, *Bristol*, 1882.

FRANCE.

Dr. G. Planchon, *Paris*, 1877.

Dr. J. Léon Soubeiran, *Montpellier*, 1871.

GERMANY.

Dr. Christian Brunnengraeber, *Rostock*, 1882.

Dr. F. A. Flückiger, *Strassburg*, 1868.

Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.

Dr. Carl Schacht, *Berlin*, 1882.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

J. von Martenson, *St. Petersburg*, 1882.

SWITZERLAND.

Dr. Edward Schaer, *Zurich*, 1877.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of Life Members in SMALL CAPITALS. Names of Life Members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Birmingham.

Norton, Edward Benjamin 1888
Stollenwerck, Alphonse Leander . . 1887

Mobile.

Brown, Albert Edward 1887
Candidus, Philip Charles 1857
Hawkins, Joseph Thomas 1878
Mohr, Charles 1871
Punch, William Francis 1874
Tucker, Mosely Fleming 1888
Van Antwerp, Garet 1880

Montgomery.

Knabe, Gustavus Alexander 1876

Selma.

Galt, Edward Pegram 1883

ARIZONA.

Phoenix, Maricopa Co.

Eschman, Clemens Louis 1889

ARKANSAS.

Batesville, Independence Co.

Goodwin, Eugene Richard 1887
Kerr, William Whitman 1887

Little Rock.

Bond, John Barnitz 1883
Bond, Sterling Price 1887
Gibson, James Edwin 1887
Jungkind, John August 1887

Pine Bluff.

Dewoody, William Lawrence 1887

CALIFORNIA.

Alameda, Alameda Co.

Elbe, Constantine Berthold 1877

Angel's Camp, Calaveras Co.

Scribner, John Cairnes 1889

Bakersfield, Kern Co.

Drury, John Stimson 1889

Centreville, Alameda Co.

Lernhart, August 1889

Eureka, Humboldt Bay.

Powell, Robert Baldwin 1880

Los Angeles.

Buehler, John Jacob 1889
Rives, Edward B. 1889

Marysville, Yuba Co.

Flint, John Henry 1889

Monterey.

Hilby, Francis Martin 1889

Oakland.

Clapp, George Henry 1889
Flint, George Benjamin 1889
Kirkland, Derwentwater 1889
Maclise, James 1889
Smith, William Clay 1889

Oroville, Butte Co.

Ekman, Nils Adolf 1889
Green, Robert Moore 1889
Norton, Lewis Elliott 1889

Pasadena.

Bley, Alphonso Albert Willetts . . . 1889

Red Bluff.

Darrough, Charles Henry 1884

Sacramento.

Ray, Frederick Edwards 1889

San Francisco.

Bacon, Gaston Ernest 1887
Bayly, Charles Alfred 1889
Beckett, Frederick Arthur 1885
Brackett, Aurick Smith 1868
Calvert, John 1870
Dawson, John Henry 1882
Devine, John 1887
Grant, Albert Warren 1889
Hastings, Benjamin 1889
Helke, William Ludwig 1889
Hulting, Frederick Benjamin 1889
Hunt, Denis Denvin 1889
Joy, Edwin Wolcott 1882
Keil, Fred. C. 1889
Lengfeld, Abraham Louis 1879
Martin, Samuel Robert 1889
Moffit, Thomas Sabatier 1861
Runyon, Edward Wheelock 1875
Schmidt, Valentine 1887
Searby, William Martin 1882
Steele, Henry 1859
Steele, James Gurden 1859
Welch, Willard Choate, Jr. 1889
Wenzell, William Theodore 1870
White, Richard Edward 1889

Santa Barbara, Santa Barbara Co.

Gutierrez, Antonio Grabirl 1889

Santa Clara.

Oberdeener, Samuel 1889

Santa Cruz.

Fay, Hamilton 1889
Rumsey, Samuel Louis 1876
Tanner, John George 1889

Santa Monica, Los Angeles Co.

Miller, William 1889

Selma, Fresno Co.

McCartney, Winfield Scott 1889

Stockton.

Holden, Isaac Dana 1889

Vacaville.

Miller, James Monroe 1889

Vallejo, Solano Co.

Topley, James 1869

Yreka.

Bradley, James Walter 1889

COLORADO.

Central City.

Best, John 1866

Denver.

Beitenman, William Wallace 1888
Chandler, Isaac Eugene 1888
Dunagan, Jesse Jackson 1889
Ford, Charles Mangan 1887
Kochan, John 1888
Kostitch, Stephen Theodore 1889
Lord, Frank Jotham. 1889
Price, Charles Asbury 1889
Scholtz, Edmund Louis 1881
Steinhauer, Frederick 1881
Thurber, Almon Russell 1880
Walbrach, Arthur. 1881

Glenwood Springs, Garfield Co.

Ewing, Frederic Charles. 1889

Lyons.

Crona, Sixtus Ewald Seine 1885

Sopris.

Davison, John Thorne. 1888

COLUMBIA, DISTRICT OF.

Washington.

Boyd, George Washington 1883
Bury, Edward Berkley. 1870
Christiani, Charles 1874
Coumbe, Oscar Henry. 1883
Cromwell, Zachariah William. . . . 1870
Duckett, Walter G 1876
Dufour, Clarence Reuter. 1876
Johnston, Henry Augustus 1883
Lockhart, George Bradfield. 1883
Major, John Richards 1873
Martin, John Charles 1883
MILBURN, JOHN ALEXANDER 1858
Milburn, Washington Coad 1883
Nattans, Arthur. 1883
Pettingill, Edward True 1880
Schafhirt, Adolph Julian . . . 1876
Simms, Giles Green Craycroft. . . . 1860

Thompson, William Scott 1871
Walton, Joseph Richardson. 1883
Wehrly, Thomas McAleer 1883

CONNECTICUT.

Ansonia.

Bristol, Charles Edward 1880
Smith, Samuel Wheeler 1889

Hartford.

Chapin, Frederick Hastings 1880
Goodrich, Stephen 1875
Goodwin, Lester Henry 1875
Rapelye, Charles Andrew 1876
Williams, John Kirby 1875

Litchfield.

Gates, Howard Eugene 1873

Meriden.

Parker, John Herbert 1880

Middletown.

Pitt, John Richard, Jr 1872

Naugatuck.

May, James Oscar. 1875

New Haven.

Dimock, Robert Hemphill 1889
Francis, Walter Russell 1882
Gessner, Emil Adolph. 1878
Spalding, Warren Alphonso 1876
Sperry, Herman Jay. 1880
Wells, Romanta. 1877

New London.

Nichols, John Cutter 1886

Norwich.

Osgood, Hugh Henry 1875
Sevin, Nathan Douglas. 1875

Putnam.

Dresser, George Edward. 1886

Stamford.

Haight, William Bogardus 1872

Thomaston.

Williams, Charles Fish 1888

Thompsonville, Hartford Co.

Smith, Edward Newton 1885

Waterbury.

Bossidy, Bartholomew 1889
Dikeman, Nathan 1859
Munson, Luzerne Ithiel 1872
Wilcox, Frederick. 1878
Woodruff, Roderick Samuel 1876

West Winsted.

Phelps, Dwight. 1873

Willimantic.

Wilson, Frank Milton 1883

DAKOTA.

Devil's Lake.

Labold, Joseph M. 1888

Grafton.

Haussamen, Henry Louis 1888

Mitchell.

Warne, Henry Lee 1881

DELAWARE.

Wilmington.

Beetem, Jacob Samuel. 1888
Belt, Zedekiah James 1876
Smith, Linton 1870
Stewart, Francis Edward. 1884
Watson, Herbert Kennedy 1888

FLORIDA.

Apopka, Orange Co.

Kent, Robert Restieaux 1855

Cedar Key.

Wooldridge, Napoleon. 1883

Fort George.

Rollins, John Francis. 1859

Jacksonville.

Aird, William 1887
Hughes, George 1887
Watson, Sidney Powell 1887

Kissimmee.

Spears, Jacob Vurnon 1887

Monticello.

Palmer, John Dabney 1888

Pensacola.

Cushman, Henry Clay. 1887

Waldo.

Wheeler, Lucien Fitch 1858

GEORGIA.

Atlanta.

Behre, Charles Henry Ernst 1882
Rankin, Jesse Willis. 1877
Renouff, James Theron. 1877
Schumann, Theodore 1860

Augusta.

Durban, Sebastian Charles 1883
Land, Robert Henry 1859

Macon.

Brunner, Norman Isaac 1878
Hunt, Leonard Washington 1878
Ingalls, John. 1876
McConville, Thomas Aloysius. . . . 1864

Thomasville.

Bondurant, Charles Scott. 1888
Thomas, Robert, Jr 1888

IDAHO TERRITORY.

Murray, Shoshone Co.

Ingalls, Albert Orfila 1885

Wallace.

Sherwin, Eugene Alonzo 1889

ILLINOIS.

Altenheim, Cook Co.

McPherson, George 1865

Bradford, Stark Co.

Plummer, David Gorham 1869

Camp Point, Adams Co.

Bartells, George Case 1881

Carlinville, Macoupin Co.

Loehr, Theodore Christian 1888

Chicago.

Bartlett, Nicholas Gray 1864
Behrens, Paul Johannes Heinrich . . 1888
BIROTH, HENRY 1865
Blocki, William Frederick 1863
Bodemann, Wilhelm 1887
Butler, George Frank 1883
Button, Charles Edwin. 1881
Conrad, John. 1887
Druehl, Frank August. 1889
EBERT, ALBERT ETHELBERT. . . . 1864
Fleischer, Adolph Theodore 1888
Frerkson, Richard Christopher . . . 1888
FULLER, OLIVER FRANKLIN 1869
Gale, Edwin Oscar 1857
Gale, William Henry 1857
Galloway, David Henry 1889
Garrison, Herod Daily. 1869
Grassly, Charles William. 1884
Hallberg, Carl Swante Nicanor . . . 1879
Hartwig, Charles Ferdinand 1881
Hogey, Julius Henry 1880
Jacobus, Judson Schradlow. 1870
Jamieson, Thomas Nevin 1888
Kadlec, Lawrence Wesley 1880
Kirchgasser, William Charles. . . . 1888
Lord, Thomas 1882
Martin, Hugo William Conrad . . . 1881
Maynard, Henry Sherman 1880
Miner, Maurice Ashbel. 1880
Oldberg, Oscar 1873
Parsons, John 1865
Patterson, Théodore Henry 1869
Puchner, William August. 1888
Rhode, Rudolph Ernst 1887
Sargent, Ezekiel Herbert 1864
Scherer, Andrew 1884
Schmidt, Frederick Michael 1887
Senier, Frederick Sutherland 1874
Truax, Charles 1882
WHITFIELD, THOMAS 1865
Wilson, Julius Henry 1869
WOLTERSDORF, LOUIS 1865
Zahn, Emil Augustus 1881

Danville.

Winslow, Edwin Cook 1879

Decatur.

Smith, Alexander Henry 1888

El Paso, Woodford Co.

Strathman, Charles August 1888

Highland.

Mueller, Adolphus 1871

Moline.

Sohrbeck, George Henry 1888

Mount Sterling.

Rickey, Charles Francis 1885

Peoria.

Benton, Wilber Merritt 1888
Zimmermann, Charles 1881

Peru, La Salle Co.

Hattenhauer, Robert Christopher . . 1881

Saybrook.

Travis, Miles Beaty 1889

Springfield.

Day, Charles Wesley 1873

INDIANA.

Bluffton.

Spitzer, George 1888

Columbus.

Stahlhuth, Ernst Henry William . . . 1887

Evansville.

Schmidt, Florian Charles 1882
Schlaepfer, Henry John 1879

Fairmount.

Edwards, Nathan Wilson 1879

Indianapolis.

Dill, John Byron 1878
Eberhardt, Ernest Godlove 1887
Frauer, Herman Emanuel 1881
Hurty, John Newell 1882
Lambert, John Albert 1879
Leist, Jacob Lawrence 1881
Lilly, Eli 1878
Sloan, George White 1857

Jasper, Dubois Co.

Mehringer, Joseph Andrew 1882

Jeffersonville.

Loomis, John Clarence 1876

Lafayette.

Green, Arthur Lawrence 1884
Hilt, David 1879

Michigan City.

Shrader, John L 1880

New Albany.

Knoefel, August 1879

Seymour.

Andrews, Josiah Harding 1879

South Bend.

Eliel, Leo 1882

Terre Haute.

Baur, Jacob 1879

IOWA.

Anamosa.

Soetje, Edward Conrad 1888

Cedar Falls, Black Hawk Co.

Bryant, William Cullen 1881

Clinton.

Majer, Oscar 1880

Davenport.

Ballard, John Winthrop 1871
Harrison, Jacob Hugh 1883

Decorah.

Weiser, Emilius Ilgenfritz 1880

Dubuque.

Ruete, Theodore William 1870
Torbert, Willard Horatio 1887

Fort Dodge.

Griffin, Horace Monroe 1889
Oleson, Olaf Martin 1877

Fort Madison.

Schafer, George Henry 1871

Iowa City.

Boerner, Emil Louis 1877

Marshalltown.

Upson, Rosa 1887

Monticello.

Tiarks, Hermann 1876

Muscatine.

Krehe, John Theodor 1884

Oskaloosa.

Pickett, John Harvey 1887

Pleasantville.

Berringer, Will Jay 1888

Sioux City.

Moore, Silas Harwood 1880
More, Arthur James 1881
Scherling, Gustav 1884

Stuart.

Treat, Joseph Augustus 1885

Washington.

Ink, Parker Peter 1888

Waterloo.

Wangler, Conrad David 1876

KANSAS.

Bridgeport, Saline Co.

Ekstrand, John Peter 1888

Coldwater.

Sombart, John Edward 1881

Lawrence.

Leis, George 1869
Moore, John Thomas 1888
Sayre, Lucius Elmer 1883

Leavenworth.

Brown, Robert J. 1862

Lincoln.

Bryant, Randolph Foster 1887

Peabody.

Roberts, Daniel John 1881

Perry, Jefferson Co.

Spangler, Henry William 1888

Salina.

Seitz, Oscar 1881

Topeka.

Merrell, Ashbel Hill 1884

Wamego.

Stone, Maurice Lewis 1888

KENTUCKY.

Carrollton.

Geier, Oscar William 1880

Covington.

Pieck, Edward Ludwig 1887
Zwick, George Albert 1874

Crittenden, Grant Co.

Collins, Richard Durbin 1887

Flemingsburg.

Reynolds, John Jefferson 1876

Frankfort.

Averill, William Henry 1874

Louisville.

Barnum, Joseph Powers 1887
Beckmann, Oscar Albert 1879
Colgan, John 1867
Diehl, Conrad Lewis 1863
Dilly, Oscar Charles 1888
Fischer, Phil 1883
Goebel, Edward 1884
Haeusgen, Henry Otto 1888
Jones, Simon Newton 1870
Kessler, Edward Frederick 1879
Mueller, Otto Edward 1888
Newman, George Abner 1866
Peyton, Robert Docker 1887
Pfingst, Edward Charles 1874
PFINGST, FERDINAND JOHN 1867
Pfingst, Henry Adolph 1874
Rademaker, Hermann Henry 1879
Renz, Frederick Jacob 1883
Rogers, Wiley 1874
Scheffer, Emil 1872
Schiemann, Edward Bernard 1880
Schoettlin, Albert John 1882
Snyder, Robert Johnson 1887
Strassel, William 1870

Somerset.

Porter, Chilton Scott 1882

Uniontown.

Hardigg, William Leopold 1881

LOUISIANA.

New Orleans.

Brand, Erich 1888
Brunswig, Lucien Napoleon 1887
Chalin, Louis Fisk 1887
Dellavallade, Jean Michel 1873
Finlay, Alexander Kirkwood 1883
Godbold, Fabius Chapman 1887
Hall, Charles Knap 1887
Johnson, John 1887
Keppler, Christian Lewis 1882
Lyons, Isaac Luria 1875
Mellon, John Joseph 1883
Metz, Abraham Louis 1887
Moore, Thomas Ferguson 1878
Robin, Oscar 1887
Rudolf, Mrs. Eliza 1887
Shorb, Joshua Eagan 1883

Baton Rouge.

Brooks, Francis Marion 1879

Bayou Goula.

Viallon, Paul Louis 1870

Franklin.

Frere, Alexander Gabriel 1882

New Iberia.

Lee, James Augustin 1856

MAINE.

Augusta.

Partridge, Charles Kimball 1867

Bangor.

Harlow, Noah Sparhawk 1859
Sweet, Caldwell 1881

Bath.

Anderson, Samuel 1876

Belfast.

Moody, Richard Henry 1876

Bethel.

Wiley, Goodwin Robert 1886

Biddeford.

Boynton, Herschel 1875

Ellsworth.

Parcher, George Asa 1875

Pittsfield.

Libby, Henry Fitzgerald 1882

Portland.

Cummings, Henry Thornton 1853
Dana, Edmund, Jr. 1877
Frye, George Carlton 1879
Hay, Edward Allston 1889
Hay, Henry Homer 1867
Perkins, Benjamin Abbott 1878

MARYLAND.

Baltimore.

Baxley, Jackson Brown 1856
Brack, Charles 1876
Burrough, Horace 1883
Caspari, Charles, Jr 1883
Culbreth, David Marvel Reynolds . . 1883
Dohme, Charles Emile 1863
Dohme, Louis 1859
Edwards, William Fletcher 1883
Elliott, Henry Alexander 1859
Emich, Columbus Valentine 1863
Frames, James Parker 1868
Gilpin, Henry Brooke 1889
Gosman, Adam John 1870
Hancock, John Francis 1863
Jennings, Nathaniel Hynson 1857
Lauer, Michael John 1865
Perkins, Elisha Henry 1857
Russell, Eugene Janus 1856
Sharp, Alpheus Phineas 1855
Simon, William 1885
Thompson, William Silver 1856
Thomsen, John Jacob 1856
Thomsen, John Jacob, Jr 1883
Tilyard, Charles Slade 1867
WINKELMANN, JOHN HENRY 1864

Chestertown.

Stam, Colin Ferguson 1882

Cumberland.

Herman, John George 1878
Shriver, Henry 1876
Shryer, Thomas Wilson 1875

Frederick City.

Schley, Steiner 1878

Hagerstown.

Winters, Jonas 1863

MASSACHUSETTS.

Boston.

Appleton, Henry Knox, Jr 1887
Babo, Leopold 1859
Bartlet, William Williams 1875
Bassett, Charles Harrison. 1867
Boyden, Edward Cleveland 1874
Burley, Edwin Porter 1877
Burnett, Joseph 1852
CANNING, HENRY 1865
Carter, Solomon 1865
Chapin, William Arms 1880
Colton, James Byers 1865
Cramer, Max 1881
CUTLER, EDWARD WALDO 1859
Davenport, Bennett Franklin 1879
Doliber, Thomas 1859

DRURY, LINUS DANA 1871
Durkee, William Carley 1885
Godding, John Granville 1875
Hoyt, George Melvin 1875
Jenkins, Luther Lincoln 1867
Jones, James Taber 1875
Jordan, William Henry 1871
Kelly, Edward Samuel 1871
Lowd, John Colby 1871
Markoe, George Frederic Holmes . . 1863
Melvin, James Samuel 1853
Metcalf, Theodore 1857
Mowry, Albert Daniel 1884
O'Brien, James John 1875
Patch, Edgar Leonard 1872
Patten, Ichabod Bartlett 1858
Pierce, William Herbert 1879
Prescott, Horace Augustus 1875
Richardson, William Allen 1887
Sawyer, William Frederick 1885
Sharples, Stephen Paschell 1875
SHEPPARD, SAMUEL AIRUS DARLINGTON 1865
Siegemund, Charles Augustus 1882
Stowell, Daniel 1875
Tower, Levi, Jr. 1860
Turner, Thomas Larkin 1853
Williams, George Gorham 1888
Wilson, Benjamin Osgood 1859
Woodbridge, George Washington . . 1859

Andover.

Parker, George Hawkins 1874

Cambridge.

Hubbard, John Henry 1866
Wood, Edward Stickney 1879

Cambridgeport.

Bayley, Augustus Ramsey 1859
Laing, Alfred Allen 1888
Orne, Joel Stone 1859

Charlestown.

Marshall, Ernest Clifton 1875
Stacey, Benjamin Franklin 1860

Chelsea.

Buck, John 1855
Buck, John Lynian 1883

Dover.

Colcord, Samuel Marshall 1852

East Pepperell.

Denham, Charles Sumner 1875

Fitchburg.

Choate, John 1877
Estabrook, Henry Arthur 1886

Great Barrington.

Whiting, Frederick Theodore 1863

Holyoke.

Ball, Charles Ely 1885

Lawrence.

Whitney, Henry Martin 1859

Lee.

Pease, Francis Merrick 1880

Lowell.

Bailey, Frederick 1869
Butler, Freeman Hall 1874
Hood, Charles Ira 1871
Kidder, Samuel 1859
Robinson, Edward Augustus 1888

Lynn.

Colcord, Joseph Webster 1882

Marlborough.

Hartshorn, Frederick Arthur 1880

Middleboro.

Drake, Charles William 1873

New Bedford.

Blake, James Edwin 1866
Bunker, Elihu 1885
Hadley, Frank Rufus 1872
Lawton, Charles Henry 1873
Lawton, Horace Allen 1873
Shurtleff, Israel Hammond 1875
Taylor, John Pitman 1875
Wright, Edward Ellsworth 1886

Newburyport.

Goodwin, William W. 1853
Homer, John 1887

Newton.

Hudson, Arthur 1882

Newton Centre.

Noble, John Joseph 1875

North Andover.

Berrian, George Washington 1857

Peabody.

Grosvenor, Daniel Prescott 1881

Pittsfield.

Manning, John Henry 1889

Quincy.

Whall, Joseph Stokes 1873

Rockland.

Easton, Luther Waite 1875
Estes, Joseph Joslyn 1870

Rockport.

Blatchford, Eben 1857

Salem.

Luscomb, William Edmund 1881
Nichols, Thomas Boyden 1876
Price, Charles Henry 1882
Price, Joseph 1888

Shelbourne Falls.

Baker, Edwin 1875

Somerville.

Cowdin, George Henry 1875
Flanagan, Lewis Cass 1875

Stockbridge.

Clark, William Bills 1880

Walpole.

Pilsbury, Frank Otis 1881

West Acton.

Hutchins, Isaiah 1880

Worcester.

Bush, William 1875
Maisch, Henry Charles Christian . . 1885
Scott, George Theodore 1883
Williams, Duane Burnett 1881

MICHIGAN.

Ann Arbor.

Brown, Henry Jefferson 1882
Eberbach, Ottmar 1869
Mann, Albert 1889
Prescott, Albert Benjamin 1871
Schlotterbeck, Julius Otto 1888
Stevens, Alonzo Burdette 1885

Armada, Macombe Co.

Phillips, Edwin Freeman 1888

Battle Creek.

Wardell, Robert C. 1860

Bay City.

Henes, William Frederick 1876

Benton Harbor.

Sheffield, William Edwin 1887

Berrien Springs.

Kephart, Henry 1887

Detroit.

Allen, Albert William 1885
Allen, William Humphries 1887
Baier, Charles George 1887
Bassett, Arthur 1888
Caldwell, James William 1875
Dupont, William 1887
Frizelle, Seymour Fuller 1888
Hawkins, Henry 1880
Haynes, David Oliphant 1887
Holt, Alvin Everett 1888
Inglis, Frank 1887
Johnston, William, Jr. 1888
Kennedy, Ezra Joseph 1887
Lyons, Albert Byron 1885
Perry, Frederick William Riley . . . 1885
Snow, Herbert Waldemar 1887
Stearns, Henry Albyn 1888
Stevens, Fred. D. 1888
Stone, Clarence George 1884
Thompson, Frank Augustus 1888
Vernor, James 1866
Wagner, George William, Jr. 1888
Webber, Joseph Le Roy 1886

East Saginaw.

Prall, Delbert Elwyn 1876

Grand Rapids.

Tibbs, William Henry 1871

Greenville.

Hall, William Alanson 1888

Holly.

Church, Howard Montague 1887

Ionia.

Gundrum, George 1882

Kalamazoo.

McDonald, George 1871

Loomis, Isabella Co.

Taylor, Celia Williams 1888

Manistee.

Lyman, Asahel Hubert 1884

Muskegon.

Brundage, Fred. 1888
Jesson, Jacob 1872
Padley, William Alfred 1888

Nottawa, St. Joseph Co.

Todd, Albert May 1885

Owosso.

Parkill, Stanley E. 1887

Red Jacket, Houghton Co.

Macdonald, Daniel Turner 1884

Saginaw City.

Keeler, William Henry 1872

MINNESOTA.

Duluth.

Boyce, Samuel F. 1871

Minneapolis.

Allen, E. Floyd 1885
Huhn, George 1884
Sanderson, Stephen Francis 1880

New Ulm.

Weschcke, Carl 1889

St. Paul.

Conger, Frederic Albert 1887
Qvale, Victor A. 1889
Simmon, Karl 1880
Stierle, Adolph 1882
Sweeny, Robert Ormsby 1866
Warren, Edwin Alonzo 1887
Wilkes, Arthur Perry 1887

Stillwater.

Hening, James Courtenay 1887

Waseca.

Rohde, Claus Frederick 1885

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William 1883

Jackson.

Ash, Matthew Franklin 1856

Port Gibson.

Shreve, John Alexander 1880

MISSOURI.

St. Louis.

Ahlbrandt, Henry Ernst 1877
Alexander, Maurice William 1871
Ault, Charles Henry. 1887
Blank, Alois 1881
Boehm, Solomon 1871
Catlin, Ephron 1871
Chamberlain, Guilford Tracy . . . 1853
Curtman, Charles Otto. 1871
Fahlen, Julius. 1889
Good, James Michener. 1871
Grandjean, Charles 1871
Grandjean, Eugene 1871
Haigh, De Lagnel. 1887
Hassebrock, Henry Fred. 1884
Hemm, Francis. 1881
James, Frank Lowber 1888
Klie, George Henry Charles . . . 1878
Leitch, Arthur 1860
Mallinckrodt, Edward 1869
Meyer, Christian Fred. Gottlieb . . . 1860
Morley, William Jarman 1876
Pauley, Frank Charles. 1879
Physick, Henry Sandford 1870
Richardson, James 1882
Richardson, Joseph Clifford. 1871
Rohlfing, Charles Henry Ferdinand . 1888
SANDER, ENNO. 1858
Scheffer, Henry William 1863
Sennewald, Ferdinand William . . . 1865
Sohn, Frank 1888
Tomfohrde, John William 1878
Ude, George 1871
Uhlich, Ferdinand G 1881
Vordick, August Henry 1874
Wall, Otto Augustus. 1884
Westmann, Frank Henry 1882
Whelpley, Henry Milton. 1887
Whitcomb, Frederick Ezekiel. . . . 1888

Carrollton.

Pettit, Henry McEwen. 1860

Conway, Laclede Co.

Anderson, Jesse Nelson 1889

Freeman.

Dolan, Frank Linley. 1888

Glenwood.

Gray, Gilbert Dillon. 1881

Independence.

Wight, Oscar Martin. 1887

Kansas City.

Eyssell, George. 1889
Ford, William Thomas. 1878
Gallagher, John Anthony. 1881
Graham, Willis Hamm. 1881
Lahme, Charles Adolph 1881

Marshall.

Franklin, Philip Henry 1881

Mexico, Audrain Co.

Duncan, Thurston Baskett 1887
Llewellyn, John Frederick 1867

Moberly, Randolph Co.

Last, Louis Christopher August . . . 1888

Pierce City, Lawrence Co.

Armstrong, George Revington . . . 1877

Rich Hill.

Youngs, William 1883

Sedalia.

Fleischmann, Augustus Theodore . . 1885

Weston.

Parr, John Conrad 1856

NEBRASKA.

Lincoln.

Daubach, Charles Joseph. 1889
Kostka, Bruno Otto 1889

North Bend.

Seykora, Edward Joseph 1887

Omaha.

Field, Amos 1871
Forsyth, James 1889
Goodman, Charles Frederick 1871
Kennard, Frank Bartlett 1883
Kuhn, Norman Archibald. 1878

NEVADA.

Gold Hill.

Jones, John, Jr 1889

Virginia City.

Perkins, William Alexander 1869

NEW HAMPSHIRE.

Claremont.

Spofford, Charles Byron 1884

Dover.

TUFTS, CHARLES AUGUSTUS 1856

Greenville.

Hall, Charles Edwin. 1884

Keene.

Hodgkins, Bert Willis. 1888

Lake Village.

Dolloff, Albert Simeon. 1888

Manchester.

Miville, Francis Charles 1877
Smith, Amasa Daniel 1889

Nashua.

Morse, Charles Milan 1888
Russell, Elias Smith. 1875
Whitman, Nelson Samuel. 1875

New Market.

Dearborn, George Luther 1853

Portsmouth.

Green, Benjamin 1888
Preston, Andrew Peabody 1881

Somersworth.

Moore, George 1859

NEW JERSEY.

Asbury Park.

Woolley, Stephen Disbrow 1888

Bloomfield.

Scherff, John Philip 1877

Bordentown.

Carslake, George Middleton 1880

Bridgeton.

Dare, Charles Ford 1889

Burlington.

Vandegrift, John A 1867

Camden.

Brown, Albert Potts 1870
Test, Alfred William 1870

East Orange.

Davis, George Randolph 1883
Niblo, William Henry 1887
Williams, Seward Whiting 1887

Elizabeth.

Brant, Edmund Wade 1882
Drake, Jonathan Baker 1875
Kent, Henry Avery, Jr. 1880
Loveland, William F 1882
Oliver, William Murray 1875

Elizabethport.

Frohwein, Richard 1867

Englewood.

Rockefeller, Lucius 1880

Freehold.

Walker, Ansell 1880
Walker, John Putnam 1881

Hoboken.

KLUSSMAN, HERMANN 1876

Jersey City.

Abernethy, Maxwell 1865
Brown, James 1888
Dougherty, Samuel Edward 1875
Kennedy, Ewen Chisholm 1888
White, George Henderson 1868
Wienges, Conrad 1875

Keyport.

Warn, William Edgar 1886

Matawan, Monmouth Co.

Slater, Frank Hovey 1882

Medford.

Thorn, Henry Prickett 1879

Montclair.

Tobin, James Martin 1887

Morristown.

Carrell, Eugene Ayres 1875

Mt. Holly.

WHITE, AARON SMITH 1860

Newark.

Betzler, Jacob 1880
Bruguier, Francis 1876
Drescher, August 1886
HOLZHAUER, CHARLES 1873
Mennen, Gerhard 1888
Sayre, Edward Augustus 1877
Sayre, William Henry 1877
Smith, Charles Bradley 1868
Smith, Israel Preston 1876
Stamford, William Harrison 1876
Van Winkle, Abraham 1871

New Brunswick.

Kilmer, Frederick Barnett 1886
Rust, William 1870

Newton.

Ryerson, Henry Ogden 1882

Orange Valley, Essex Co.

Yatman, John Lewis 1880

Plainfield.

Miller, Joseph Gilbert 1886
Reynolds, Howard Prescott 1875
Shaw, Robert Johnston 1875

Roselle.

Tiernan, Frank Mortimer 1880

Salem.

Bassett, Joseph 1880

Somerville.

Cook, Gilbert Snowden 1886

South Amboy.

JACQUES, GEORGE WASHINGTON . . 1869

Trenton.

DeCou, James Clarke 1880

NEW YORK.

New York City.

Atwood, Herman White 1873
Balluff, Paul 1860
Balser, Gustavus 1875
Bedford, Peter Wendover 1859
Bendiner, Samuel Julius 1882
Billings, Henry Merry 1869
Chandler, Charles Frederic 1867
Davis, Benjamin 1869

Dick, Dundas	1879
Ditman, Andrew Jackson	1868
Dudley, Oscar Earle	1877
Ebbitt, William Henry	1889
Eimer, Charles	1872
Fairchild, Benjamin Thomas	1875
Fairchild, Samuel William	1887
Fink, Frederick William	1886
Fisher, William	1862
Foulke, James	1881
Fraser, Horatio Nelson	1888
Gardner, Robert Winslow	1867
Geisler, Joseph Frank	1889
Giles, William Michael	1888
Gilmore, John Wesley	1872
Griffith, Albert Richard	1870
Hauenstein, William	1883
Hays, Benjamin Franklin	1886
Hays, David	1867
Hegeman, Johnson Niven	1880
Herzfeld, Herman	1885
Higgins, James Starkey	1862
Hoffmann, Frederick	1867
Hohenthal, Charles Frederick Lebe-recht	1865
Hudnut, Alexander	1857
Hughes, Albert Ernest	1888
Ihlefeld, Conrad Heinrich	1881
Jungmann, Julius	1879
Kalish, Julius	1875
Kemp, Edward	1888
Knapp, Frank Fiero	1880
Lazell, Lewis Thurber	1858
Maclagan, Henry	1883
Macmahan, Thomas Jackson	1871
Main, Thomas Francis	1872
Massey, William Morton	1885
McIntyre, Byron Floyd	1876
McIntyre, Ewen	1873
McKesson, George Clinton	1888
McKesson, John, Jr.	1867
MILHAU, EDWARD LEON	1858
Molwitz, Ernest	1867
O'Neil, Henry Maurice	1879
Osmun, Charles Alvin	1868
Painter, Emlen	1870
Peixotto, Moses Levi Maduro	1869
Pfingsten, Gustavus	1873
Plummer, Edward	1889
Quackinbush, Benjamin Franklin	1886
Ramsperger, Gustavus	1860
Reichardt, Frederick Alfred	1871
Rice, Charles	1870
Ricksecker, Theodore	1870
Sands, George Gedney	1867
Schmid, Henry	1886
Schmidt, Ferdinand Traugott	1887
Scofield, James Stephen	1867
SEABURY, GEORGE JOHN	1876
Shiels, George Emanuel	1860
Skelly, James Joseph	1866
Starr, Thomas	1870
Tscheppe, Adolph	1876
Turner, Isaac Worthington	1882
Vennard, William Lawrence	1888
Weinman, Oscar Christian	1873
Wichelus, Frederick	1881
Wickham, William Hull	1870
Wilson, William	1876
Winters, John Henry	1888
Wohlfarth, Justin	1879

Brooklyn.

Aspinall, Walter Albert	1880
Benjamin, James Henry	1878
Brooks, George Washington	1879
Close, George Cassidy	1858
Curtiss, Charles Grenville	1866
Cutts, Foxwell Curtiss, Jr	1875
Davis, William Mortimer	1879
Day, Carlos Erastus	1870
DeForest, William Pendleton	1879
Dennin, Charles	1875
Douglas, Henry, Jr	1875
Dunn, John Augustus	1867
Du Puy, Eugene	1852
Eccles, Robert Gibson	1885
Haviland, Henry	1857
Heydenreich, Emile	1867
Krieger, Philip	1876
Lehn, Louis	1874
Levy, Adolph	1877
Livingston, Barent Van Buren	1872
McElhenie, Thomas Diamond	1872
Newman, George Anthony	1865
Niebrugge, John August	1861
Ollif, James Henry	1867
Owens, Richard John	1860
Pyle, Cyrus	1859
Reusch, Ernst	1882
Reynolds, Charles Edward	1882
Snyder, Ambrose Chancellor	1867
Squibb, Edward Hamilton	1882
Squibb, Edward Robinson	1858

Stevens, Luther Fuller 1879
Strachan, William Edward 1880
Wynn, William 1867
Zellhoefer, George. 1876

Albany.

Clement, Henry Bratt 1880
French, William Barker 1880
Gaus, Charles Henry. 1879
Gaus, Louis Henry 1880
Gibson, Charles 1880
Huested, Alfred Birch 1879
McClure, William Henry 1880
Michaelis, Gustavus 1882
Sauter, Louis. 1879
Turner, George Heather 1880
Walker, William John 1880
Wheeler, Leonard Hiram. 1883

Auburn.

Stanley, Edgar Clarke 1880

Binghamton.

Otis, Clark Zelotes 1886

Buffalo.

Drefs, Charles Adams 1882
Gregory, Willis George 1886
Hayes, Horace Phillips. 1880
Mosher, Rosa Belle 1888
Peabody, William Huntington . . . 1857
Rano, Charles Orlando. 1866

Catskill.

Du Bois, William Laneman 1880

Cohoes, Albany Co.

Travis, J. Walton 1888

Croton Lanaing.

Henry, Charles (Dworniczak) 1881

Elmira.

Holmes, Clayton Wood 1873

Fairport.

Rich, Willis Simmons 1882

Fishkill on Hudson.

Moith, Augustus Theodore 1860

Flushing.

Hepburn, John 1873
James, William Tefft 1882

Geneseo, Livingston Co.

Rogers, Arthur Henry 1882

Gloversville, Fulton Co.

Miller, Jason Albert 1879
Van Auken, Jerrie A. 1880

Hannibal.

Brewster, Wadsworth J. 1880

Holley, Orleans Co.

Bishop, Francis Myron 1882

Ithaca, Tompkins Co.

Viall, William Angell 1889

Jamaica, Queens Co.

Baylis, Lewis Fosdick 1880
Goodale, Harvey Galusha 1879
Peck, George Lyman 1883

Kingston.

Dedrick, William Frederick 1884

Middletown.

KING, JAMES THEODORE 1859
Rogers, William Henry 1869

Mount Vernon.

Gill, George 1872

Newburgh.

Chapman, Isaac Close 1887
Tartiss, Alfred Joseph 1867

Nyack, Rockland Co.

De Graff, David 1879

Olean.

Coon, James Van Deventer. 1880

Oswego.

Butler, Charles Henry 1887

Plattsburgh.

Smith, Jay Hungerford 1883

Port Chester.

Hyler, William Henry. 1875

Potsdam.

Thatcher, Hervey Dexter 1865

Richfield Springs.

Smith, Willard Alfred 1880

Rochester.

Aman, Henry 1882

Davis, Edward Hatch 1880
Haas, George Herman 1872
Paine, James Dixon 1857
Schmitt, Joseph Max 1882
Smith, Willard*. 1880

Rome.

Bissell, John Gordon 1875
Owens, James Alanson 1882

Saratoga Springs.

Fish, Charles Frederick 1866
Mingay, James 1873
Pennington, Thomas Henry Sands. . 1877

Schenectady.

Hanson, Willis Tracy 1880

Stillwater, Saratoga Co.

Schermerhorn, Winfield Scott 1880

Syracuse.

Dawson, Edward Seymour, Jr. . . . 1876
Snow, Charles Wesley 1876

Tonawanda, Erie Co.

Scoville, Charles Henry 1882

Utica.

Blaikie, William 1879
Cone, John Wright 1876

Waterville, Oneida Co.

Bissell, Emery Gilbert 1879

Wellsville, Allegheny Co.

Hall, Edwin Bradford 1879

Yonkers.

Eschman, Frederick William Rudolf. 1880
Fuller, Henry Weld 1865
Wray, George Brown 1888

NORTH CAROLINA.

Chapel Hill.

Saunders, Richard Banbury 1858

Charlotte.

Wearn, William Henry 1888

Durham, Orange Co.

Vaughan, Parry Wyche 1882

Fayetteville.

Sedberry, Bond English 1882

New Berne.

Hancock, Franklin Wills 1888

Oxford.

Crawford, Thomas Dalzell 1888

Raleigh.

Simpson, William 1873

Tarboro.

Zoeller, Edward Victor 1878

Washington.

Gallagher, Charles Kewell 1857

Wilmington.

Hardin, John Haywood 1881
Munds, James Cassidy 1878

OHIO.

Cincinnati.

Bain, Andrew Watson 1874
Betz, Otto Edward 1887
Crowther, Frederick Augustine . . . 1887
De Lang, Alfred 1887
Eger, George 1864
Fennel, Charles Theodore Piderit . . 1886
Goodman, Emanuel 1879
Gordon, William John Maclester . . 1854
Greve, Theodore Lund August . . . 1864
Greyer, Julius 1880
Heineman, Otto 1864
Heun, Emil 1881
Hildreth, Newton Gough. 1879
Hoffman, Julius. 1887
JUDGE, JOHN FRENCH 1866
Karmann, William 1864
Klayer, Louis 1884
Koehnken, Herman Henry 1875
Lammert, Cyrus Joseph 1881
Lloyd, John Uri 1870
Meininger, Albert. 1881
Merrell, Charles George 1888
Merrell, George 1879
Norwood, Theodore Franklin. . . . 1887
Phillips, Charles Wilson 1881
Rendigs, Charles Peter. 1876
Ruppert, John 1880
Sauer, Louis Wendlin 1882
Schreck, Leocadio Santos 1881
Serodino, Herman 1880
Simonson, William 1887
Vilter, Herman T. 1881

Wagner, Henry. 1876
Walton, Harry Clifford. 1881
Wells, Jacob David 1864
Wetterstroem, Albert Frederick Charles 1888
Yorston, Matthew Mackey 1864
Zuenkeler, John Ferdinand 1887

Ada, Hardin Co.

Ashbrook, Charles Shaw 1887

Akron.

Armstrong, Andrew Moorehouse . . 1876
Inman, Charles Trask 1885
Smith, Joseph Stahle 1878

Bryan.

Snyder, Alva Leach 1873

Canton.

McFarland, Thaddeus Day 1887

Chillicothe.

Howson, Arthur Bayshawe 1886
Howson, Walter Henry 1875
Nipgen, John Alvin 1879

Circleville.

Evans, Samuel Barlow. 1881

Cleveland.

Acker, Philip. 1889
Asplin, John Harding 1882
Biddle, Herbert George 1888
Bruce, James. 1882
Cobb, Ralph Lathrop 1883
Deutsch, Julius William 1888
Dreher, Louis 1881
Feil, Joseph 1885
Fischer, Henry John 1888
Gaylord, Henry Cleveland 1869
Gegelein, Frederick Leonhardt . . . 1881
Glines, George Walter 1881
Grosse, Gottlieb Matthew 1888
Haber, Louis Anthony. 1881
Hahn, Sigismund Joseph Frederick. . 1887
Hechler, George Louis 1882
Heller, Marx Mier 1888
Hopp, Lewis Christopher 1876
Kuhlmeier, Henry 1888
Lehr, Philip 1885
May, Arthur Ferdinand 1881
Mayell, Alfred 1872
Myers, Daniel 1882
Rosewater, Nathan 1880
Schambs, George Matthias 1882
Schellentrager, Ernst August 1882
Schoenhut, Christian Henry 1888
Scott, William Johnson 1872
Slosson, Frank West. 1882
Smithnight, Albert 1882
Spenzer, Peter Ignatius 1872
Urban, Jacob Philip 1881
Voss, George William 1885

Columbiana.

Ink, Charles Elliott 1885

Columbus.

Bruck, Philip Henry. 1884
Cook, Harry Clifford. 1887
Herbst, Frederick William 1882
Hoffman, Otto Louis 1883
Huston, Charles 1872
Karb, George James. 1883
Kauffman, George Beecher 1882
Schueller, Ernst 1881
Schueller, Frederick William 1880
Sherwood, Louis Walker 1882

Dayton.

Burkhardt, Mark Anthony 1887
Kurfurst, Henry Ferdinand. 1881
Spengler, John George. 1887
Weusthoff, Otto Sittel 1879

Delhi, Hamilton Co.

Carpenter, Samuel William 1883

Gallipolis.

Schaf, Justus Henry. 1875

Glendale, Hamilton Co.

Feemster, Joseph Hall. 1873

Grand Rapids, Wood Co.

Thurston, Azor. 1886

Haselton, Mahoning Co.

Erwin, James Jay 1888

Logan.

Harrington, Frank 1869

Massillon, Stark Co.

Baltzly, Zachariah Taylor 1876
Kirchhofer, Peter Paul. 1881

Middletown.

Johnson, Charles Brayton 1876

Navarre.

Grossklaus, John Ferdinand 1859

North Baltimore, Wood Co.

Clark, Frank P. 1882

Norwood, Hamilton Co.

Weyer, John 1887

Salem, Columbiana Co.

Hawkins, Michael Smith 1870

Springfield.

Casper, Thomas Jefferson 1867
Ludlow, Charles 1872
Siegenthaler, Harvey N. 1882

Tiffin.

Fleck, Jacob J 1883
Marquardt, Jacob Frederick 1881

Toledo.

Deitz, Charles Jacob 1888
Hohley, Charles 1872
Reed, Isaac Newton 1881

Troy.

Tobey, Charles William 1879

Washington Court House.

Boyer, Harry 1887

Watertown.

Bohl, Conrad. 1881

Wooster.

Ohliger, Lewis Philip 1871

Youngstown, Mahoning Co.

Fischer, Emil A. 1887

Zanesville.

Hatton, Edgar Melville 1878

OREGON.

Eugene.

Wilkins, Frank Marion 1889

Portland.

Blumauer, Louis 1889
Clarke, Louis Gaylord 1889
Dietrick, H. Dixon 1889
Laue, John Max Alfred 1889
Neppach, Stephen Albert 1889
Pfunder, William 1889
Sitton, Charles Edward 1878
Woodard, Charles Henry. 1889
Woodward, William Finch 1889

PENNSYLVANIA.

Philadelphia.

Angney, John R. 1867
Baker, Walter Theron 1885
Bauer, Louis Gustavus. 1867
Blair, Henry Cowen. 1868
Borell, Henry Augustus 1874
Boring, Edward McCurdy 1867
Bostick, Elmer Ellsworth 1888
Bower, Henry 1860
Bower, Henry Albert 1868
Bullock, Charles 1857
Bunting, Samuel Sellers 1857
Burg, John Dellinger 1888
Campbell. Samuel. 1864
Cook, Thomas Penrose. 1877
Dobbins, Edward Tompkins 1867
Eberle, Charles Louis 1865
Eddy, Henry Clay 1869
Ellis, Evan Tyson 1857
England, Robert 1868
Finnerty, Edward John, Jr. 1887
Fox, Peter Paul. 1869
Früh, Carl Daniel Stephan 1876
Gerhard, Samuel 1873
Grahame, Israel Janney. 1856
Grove, John Eberly 1868
Haenchen, Charles Eugene 1865
Hance, Edward Hance 1857
Hancock, Charles West 1868
Hanson, Arthur Edward 1888
Hassinger, Samuel Ellphat Reed . . 1880
Heintzelman, Joseph Augustus . . . 1858
Hoskinson, John Thomas, Jr. 1881
Jenks, William Jenks 1858
Jones, Alexander Henry 1874
Jones, Daniel Sexton 1859
JONES, EDWARD CHARLES 1864
Keeney, Caleb Reynolds 1868
Keys, Roger 1868
Kline, Mahlon Norwood 1876
Koch, Louis 1872
Krewson, William Egbert 1875
MAISCH, JOHN M. 1856
McIntyre, William 1868
McKelway, George Irwin 1874
Mellor, Alfred 1864
Miller, Adolph William 1868

Milligan, Decatur 1867
Moore, Joachim Bonaparte 1860
Morris, Lemuel Iorwerth 1880
Munson, James Harry 1889
Murray, Bernard James 1882
Newbold, Thomas Mitchell. 1876
Ottinger, James Jeremiah. 1876
Perot, Thomas Morris. 1857
Pile, Gustavus. 1881
Poehner, Adolph Adam 1889
Post, Elisha 1876
Preston, David 1868
Procter, Wallace 1874
REMINGTON, JOSEPH PRICE 1867
Riley, Charles William. 1868
Rittenhouse, Henry Norman 1857
Robbins, Alonzo 1865
Rosengarten, Mitchell George. . . . 1869
Shinn, James Thornton 1860
Shivers, Charles 1860
Shoemaker, Richard Martin 1869
Spannagel, Charles Christian 1874
Stryker, Cornelius Whitenack 1886
Taylor, Alfred Bower 1852
Thompson, William Beatty. 1858
Trimble, Henry. 1876
Walch, Robert Henry 1879
Warner, William Richard. 1857
Webb, William Henry. 1867
Weber, William 1872
Weidemann, Charles Alexander. . . 1868
Wendel, Henry Edward 1873
Wiegand, Thomas Snowdon 1857
Wright, Archibald Wesley 1868
ZEILIN, JOHN HENRY 1859

Allegheny City.

Armor, Alpheus. 1882
Eggers, Frederick Hermann. 1872
Slocum, Frank Leroy 1880

Allentown.

Klump, Charles Christian 1880

Beaver, Beaver Co.

Andriessen, Hugo. 1875

Bellefonte, Centre Co.

Zeller, William Samuel 1881

Bristol.

Pursell, Howard 1880
Young, John Kroesen 1887

Carlisle.

Horn, Wilbur Fisk 1876

Chambersburg.

Cressler, Charles Henry 1868

Easton.

Weaver, John Archibald 1873

Franklin.

Riesenman, Joseph. 1883

Hanover, York Co.

Sniveley, Andrew Jackson 1883

Harrisburg.

George, Charles Theodore 1873
Gorgas, George Albert 1884
Gross, Edward Ziegler. 1883
Miller, Jacob Augustus. 1873
Weills, William Melanchthon Luther. 1885

Hyde Parke, Scranton, Luzerne Co.

Morgan, Benjamin George 1876

Lancaster.

HEINITSH, CHARLES AUGUSTUS . . 1857
Heinitsh, Sigmund William 1889

Lebanon.

LEMBERGER, JOSEPH LYON. 1858
Redsecker, Jacob Henry 1881

Lock Haven.

Prieson, Adolph. 1880

Mansfield, Tioga Co.

Ridgway, Lemuel Augustus 1882

Meadville.

Zinck, Charles Morris 1888

Minersville

Burns, John Kellar 1876

Mt. Pleasant, Westmoreland Co.

McElwee, Emer Judson 1888

Norristown.

Stahler, William 1880

Oil City.

Krosskop, William Burton . . . 1887

Pittsburgh.

Beach, Clifton Hilliard 1883
Emanuel, Louis 1878

Henderson, Archibald Keys 1888
Holland, Samuel Smith 1876
Kelly, George Armstrong 1882
Nisbet, William Washington 1883
Robertson, Archibald Craig 1882
Stevens, Salmon Henry 1885
Wilson, Albert Hemphill 1883

Pittston.

Rhoades, Stephen Howard 1876

Pottsville.

Deibert, Thomas Irvin 1882
Kennedy, George Washington . . . 1869

Reading.

Fox, Daniel Soder 1872
Stein, Jacob Henry 1869
Ziegler, Philip Milton 1867

Rochester, Beaver Co.

Finley, Norval Howard 1889

Schuylkill Haven.

Commings, Charles Samuel 1888

Scottdale, Westmoreland Co.

Aubley, Samuel 1888
Cummings, Theodore Foster 1882
Hodgkins, Israel Marion 1887
McNeil, John Murray 1882

Shamokin.

Smink, William Henry R. 1885

Shenandoah, Schuylkill Co.

McCarthy, Cornelius Joseph 1886

Towanda.

Porter, Henry Carroll 1880

West Chester.

Evans, Joseph Spragg 1877

White Haven.

Driggs, Charles M. 1881

Wilkes-Barre.

Jones, Samuel Stephen 1887
Wolfe, Nathaniel 1878

Williamsport.

Cornell, Edward Augustus 1873
Duble, Jesse Balderston 1870
Hill, Justin Luther 1887

York.

Patton, John Franklin 1880

RHODE ISLAND.

Newport.

Cole, Charles Mowry 1888
Cotton, William Henry 1885
Downing, Benjamin Franklin, Jr. . . 1886
Taylor, James Henry 1875
Wellington, Arthur Wellesley 1886

Pawtucket.

Jillson, Frederick Winfield 1887

Providence.

Alfreds, Henry James 1883
Blanding, William Bullock 1875
Calder, Albert Layton 1859
Cates, William Everett 1888
Danforth, Edmund Culver 1878
Fenner, Alexander Wilson 1888
Greene, William Ray 1883
Mason, Norman Nelson 1875
O'Hare, James 1888
Reynolds, William Keyes 1876
Walling, Walter Augustus 1886
Wood, Mason Bowen 1882

Westerley.

Collins, Albert Burlingame 1882

SOUTH CAROLINA.

Charleston.

Aimar, Charles Pons. 1879
Burnham, Edward Steinmeyer . . . 1874
Eckel, Augustus William. 1874
Marsteller, George Ludwig. 1883
Michaelis, Charles Otto 1874
Panknin, Charles Frederick. 1874
Vogt, Diedrich 1889

Columbia.

Thomas, Oscar Ernest 1882

TENNESSEE.

Chattanooga.

Greve, Charles Mathias 1887

Greenville, Green Co.

Miller, Charles Gough. 1889

Knoxville.

Yeager, Alvin Adams 1888

Memphis.

Kleinschmidt, Anton August 1889
Robinson, James Scott. 1869

Nashville.

Burge, James Oscar 1878
Laurent, Eugene Leonard 1872
Rascoe, Lucius 1887
Thomas, James, Jr. 1875
Thompson, James Ligon 1888
Wharton, John Criddle 1872
Wharton, William Henry. 1876

TEXAS.

Chillicothe, Hardeman Co.

Keller, Frederick Philander Peter. . 1888

Dallas.

Keene, Thomas Rucker 1888
Weichsel, Francis. 1881

El Paso.

Irvin, William Armstrong 1879

Fort Worth.

Harper, Harry Winston 1881
Powell, Thomas Wallace. 1874
Wells, Ebenezer Miller. 1878

Galveston.

Preston, Calvin Walbridge 1884

Laredo.

Warne, Henry Lee 1881

Marshall.

Lancaster, Edwin Walter 1884

San Antonio.

Kennedy, James 1887

Waco.

King, Walter Blackburn 1883

UTAH.

Salt Lake City.

Farlow, John Boylan 1889

VERMONT.

Brandon.

Crossman, George Alvin 1872

Morrisville.

Gates, Amasa Oscar 1876

St. Johnsbury.

Bingham, Charles Calvin 1875

White River Junction.

Trask, Charles Mitchell 1875

Windsor.

Paine, Milton Kendall 1875

VIRGINIA.

Danville.

Cole, Howson White 1882

Fredericksburg.

Hall, Marshall Carter 1870

Lynchburg.

Craighill, Edward Addison 1888

Norfolk.

Jackson, Edward Calvert 1883

Petersburg.

Beckwith, Edmund Ruffin 1886
Knock, Thomas Franklin 1882

Richmond.

Baker, Thomas Roberts 1873
Scott, William Henry 1873

WASHINGTON.

La Conner, Skagit Co.

Joergensen, Gerhard Johan Carl Sophus. 1889

Seattle.

Kellogg, Gardner 1882

Walla Walla.

Holmes, Henry Elliott 1880

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie 1872
Potterfield, Clarence Asbury 1882

Wheeling.

Bocking, Edmund 1874
Gray, William Howlett 1880
Menkemeller, Charles 1880
Williams, William Hudson 1880

WISCONSIN.

Eau Claire.

Godding, Edward Robert 1884

Fountain City.

Bechman, Charles Richard 1882

Janesville.

Prentice, Fred. F. 1876

La Crosse.

Beyschlag, Charles 1880

Madison.

Bernhard, Charles Henry 1888
Hollister, Albert Henry 1884
Power, Frederick Belding 1872

Mayville, Dodge Co.

Sauerhering, Rudolph Aurelius . . . 1884

Milwaukee.

Conrath, Adam 1881
Crolius, Frank Marcelous 1884
Dadd, John Alfred 1880
Drake, John Ransom 1860
Kienth, Hans 1884
Meissner, Paul Ernest 1888
Schrank, Charles Henry 1876

Neillsville.

Sniteman, Charles Clarence 1881

BERMUDA.

Hamilton.

Heyl, James Bell 1863

COSTA RICA.

San José.

Hermann, Frederick Francis 1888

DOMINION OF CANADA.

NOVA SCOTIA.

Halifax.

Simson, Francis Cook 1876

Kentville.

Masters, Robert Silas 1883

Pictou.

Fraser, Robert Peden 1885

ONTARIO.

Goderich.

Jordan, Frederick Francis 1877

Lindsay.

Gregory, Edmund 1875

Ottawa.

Saunders, William 1860

St. Thomas.

Foster, William Orrville 1881

Stratford.

Waugh, George James 1862

Toronto.

Lander, John Cambridge 1877
Lowden, John 1875
Robinson Ernest Frankish 1889

Windsor.

D'Avignon, John Eugene 1888

PRINCE EDWARD ISLAND.

Charlottetown.

Dodd, Simon Walker 1884
Johnson, Arthur Sterling 1889

QUEBEC.

Montreal.

Gray, Henry Robert 1867
Lachance, Seraphin 1888

Quebec.

Morrison, Joseph Edward 1888

Three Rivers.

Williams, Richard Wellington . . . 1883

MEMBERS RESIDING IN EUROPE.

Burroughs, Silas Mainvielle, London, England 1876
Coblentz, Virgil, Berlin, Germany 1882
Kremers, Edward, Bonn, Germany 1887
Mason, Alfred Henry, London, England 1884
Wellcome, Henry Solomon, London, England 1875

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Wellington, Arthur W., Newport, R. I.

Wells, Ebenezer M., 509 Houston street, Fort Worth, Texas.

Wells, Jacob D., Fourth street and Central avenue, Cincinnati, O.

Wells, Romanta, No. 297 State street, New Haven, Conn.

Wendel, Henry E., Third and George streets, Philadelphia, Pa.

Wenzell, William T., No. 153 Grove street, San Francisco, Cal.

Wescheke, Carl, New Ulm, Minn.

Westmann, F. H., No. 2744 Cass avenue, St. Louis, Mo.

Wetterstroem, Albert, 435 Colerain avenue, Cincinnati, O.

Weusthoff, Otto S., No. 218 East Third street, Dayton, O.

Weyer, John, Norwood, Hamilton co., O.

Whall, Joseph S., No. 82 Hancock street, Quincy, Mass.

Wharton, John C., No. 38 Union street, Nashville, Tenn.

Wharton, William H., No. 38 Union street, Nashville, Tenn.

Wheeler, Leonard H., No. 78 State street, Albany, N. Y.

Wheeler, Lucien F., Waldo, Fla.

Whelpley, Henry M., No. 113 Market street, St. Louis, Mo.

Whitcomb, Frederick E., No. 117 Olive street, St. Louis, Mo.

WHITE, AARON S., No. 59 High street, Mt. Holly, N. J.

White, George H., Newark and Jersey avenues, Jersey City, N. J.

White, Richard E., No. 400 Hayes street, San Francisco, Cal.

WHITFIELD, THOMAS, No. 240 Wabash avenue, Chicago, Ill.

Whiting, Frederick T., Main street, Great Barrington, Mass.

Whitman, Nelson S., No. 175 Main street, Nashua, N. H.

Whitney, Henry M., No. 297 Essex street, Lawrence, Mass.

Wichelus, Frederick, No. 192 Greenwich street, New York, N. Y.

Wickham, William H., No. 91 Fulton street, New York, N. Y.

Wiegand, Thomas S., No. 4 South Thirty-eighth street, Philadelphia, Pa.

Wienges, Conrad, No. 649 Jersey avenue, Jersey City, N. J.

Wight, Oscar M., Lexington street, Independence, Mo.

Wilcox, Frederick, Apothecaries' Hall, Exchange Place, Waterbury, Conn.

Wiley, Goodwin R., Main street, Bethel, Me.

Wilkes, Arthur P., Seven Corners, St. Paul, Minn.

Wilkins, Frank M., Eugene, Oregon.

Williams, Charles F., Main street, Thomaston, Conn.

Williams, Duane B., No. 16 Lincoln Square, Worcester, Mass.

Williams, George G., No. 89 Broad street, Boston, Mass.

Williams, John K., No. 391 Main street, Hartford, Conn.

Williams, Richard W., Notre Dame street, Three Rivers, Quebec, Can.

Williams, Seward W., No. 358 Williams street, East Orange, N. J.

Williams, William H., No. 659 Main street, Wheeling, W. Va.

Wilson, Albert H., Penn street and Frankstown avenue, Pittsburgh, Pa.

Wilson, Benjamin O., No. 28 Merchants' Row, Boston, Mass.

Wilson, Frank M., No. 133 Main street, Willimantic, Conn.

Wilson, Julius H., No. 125 Twenty-second street, Chicago, Ill.

Wilson, William, No. 106 Broadway, cor. Pine street, New York, N. Y.

WINKELMANN, JOHN H., Liberty and German streets, Baltimore, Md.

Winslow, Edwin C., No. 107 Main street, Danville, Ill.

Winter, Jonas, No. 202 Prospect street, Hagerstown, Md.

Winters, John H., 2238 Seventh avenue, New York, N. Y.

Wohlfarth, Justin, No. 36 Gold street, New York, N. Y.

Wolfe, Nathaniel, Wilkesbarre, Pa.

WOLTERSDORF, LOUIS, No. 171 Blue Island avenue, Chicago, Ill.

Wood, Edward S., No. 14 Chauncey street, Cambridge, Mass.

Wood, Mason B., P. O. Box 58, East Providence, R. I.

Woodard, Charles H., No. 92 Front street, Portland, Oregon.

Woodbridge, George W., No. 160 State street, Boston, Mass.

Woodruff, Roderick S., No. 91 Blank street, Waterbury, Conn.

Woodward, Wm. F., 141 First street, Portland, Oregon.

Wooldridge, Napoleon, Cedar Key, Fla.

Woolley, Stephen D., Asbury Park, N. J.

Wray, George B., P. O. Box 721, Yonkers, N. Y.

Wright, Archibald W., Front and Market streets, Philadelphia, Pa.

Wright, Edward E., No. 24 Sycamore street, New Bedford, Mass.

Wynn, William, No. 496 Fulton street, Brooklyn, N. Y.

Yatman, John L., Orange Valley, N. J.

Yeager, Alvin A., 134 Gay street, Knoxville, Tenn.

Yorston, Matthew M., No. 429 Central avenue, Cincinnati, O.

Young, John K., P. O. Box 235, Bristol, Pa.

Youngs, William, 114 Park avenue, Rich Hill, Mo.

Zahn, Emil A., No. 1801 State street, Chicago, Ill.

ZEILIN, J. HENRY, No. 306 Cherry street, Philadelphia, Pa.

Zeller, William S., No. 14 Brinkerhoff Row, Bellefonte, Centre county, Pa.

Zellhoefer, George, cor. Broadway and Hart street, Brooklyn, N. Y.

Ziegler, Philip M., No. 526 Penn street, Reading, Pa.

Zimmerman, Charles, No. 423 S. Adams street, Peoria, Ill.

Zinck, Charles M., cor. Water and Chestnut streets, Meadville, Pa.

Zoeller, Edward V., Main street, Tarboro, N. C.

Zuenkeler, J. Ferd., 686 Vine street, Cincinnati, O.

Zwick, George A., Eleventh street and Madison avenue, Covington, Ky.

LIST OF RESIGNATIONS.

Albro, Willis H.
Atwood, Luther L.†
Blair, Andrew.*
Bolles, Wm. P.‡
Buntin, Wm. C.†
Caffee, Amos H.†
Copeland, John W.
Dalrymple, Chas. H.‡
Easton, Luther W.†
Elfers, Jos. C.‡
Fraser, Edward A.‡
Goodale, Thomas W.
Jacobs, Joseph.†
Keasbey, Henry G.†
Kitchen, Chas. W.‖
Leith, Harvey I.†
Mattison, Rich. V.†
Melchers, Henry.‡
Miller, Otho F. S.*
Miller, Rob. M.†
Musler, Abram.†
Reinhold, William.†
Ross, Ellison H.*
Ross, Wm. H.*
Slosson, George.†
Staley, Michael C.†
Thompson, Edward.†
Todd, Wm. J.‡
Wackerbarth, John.†
Wahmhoff, Julius H.†
Watson, William H.†
Welch, Leonard E.‡

* Inability to attend the meetings. † No reason given. ‡ Left the business. ‖ Failing health.

LIST OF DECEASED MEMBERS.

Since the last meeting, notice of the death of the following members has been received:

Willis Benedict,	New Haven, Conn.	Elected 1882.
George Buck,	Chicago, Ill.	" 1860.
George E. Cook,	Port Jervis, N. Y.	" 1872.
Adolph Duflos,	Annaberg, Germany.	" 1871.
Edmund Knoebel,	Highland, Ill.	" 1882.
Frederick H. Masi,	Norfolk, Va.	" 1873.
Henry J. Menninger,	Brooklyn, N. Y.	" 1866.
Louis E. Nicot,	Brooklyn, N. Y.	" 1875.
Henry Schrader,	Indianapolis, Ind.	" 1869.
Abel S. Sweet, Jr.,	Bangor, Me.	" 1883.
Joseph G. Thibodeaux,	Thibodeaux, La.	" 1870.

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